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CEREAL COURIER

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION).

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Vol. 12. January 15, 1920. No. 1.
Personnel (Jan. 1-15) and Station (Dec. 1-31) Issue.

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PERSONNEL ITEMS

A. F. Bracken, who has been in Washington since early in December engaged in the preparation of his annual report and consulting with crop specialists, left on January 5 for Logan, Utah, where he will prepare a manuscript for publication on certain of the experiments of the Nephi Substation for publication as a bulletin of the Utah Agricultural Experiment Station. He will return to Nephi some time before March 1.

Leroy E. Compton, who has been engaged on plat experiments in the study of wheat scab at Madison, Wis., and Bloomington, Ill., has resigned, effective January 15.

Miss Maude Dawson was transferred on January 4 to the Seed Laboratory of this Bureau, where she will assist in the making of germination tests. For the past several months she has been detailed to the Office of Plant Disease Survey to assist in the tabulation of results obtained last summer in the survey of the distribution of cereal diseases.

Chester I. Greene, who has been helping Mr. Holbert in the taking and keeping of records at Bloomington, Ill., has been appointed stenographer and typewriter from civil service register, effective January 16, and assigned to duty at Bloomington.

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Miss Vesta C. Haney, an assistant in the Office of the State Director of Nurseries and Orchards at East Lansing, Mich., has been appointed an agent in the Office of Cereal Investigations, effective January 1, to bring about closer cooperation in the barberry eradication campaign. The Inspector of

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Nurseries and Orchards is the State Assistant who has power to compel eradication where it is not done voluntarily.

Ralph W. May, Scientific assistant in charge of cereal experiments on the Judith Basin Substation, Moccasin, Mont., arrived in Washington on January 12, for the purpose of preparing his annual report on the cooperative cereal experiments at Moccasin for 1919 and of consulting with crop specialists.

Walter F. Plaenert has resigned effective December 31. He has been in charge of the temperature tanks in the greenhouses at Madison, Wis..

Obil Shattuck, superintendent of the Harney County Dry-Farming Substation, Burns, Oreg., arrived in Washington January 15, where he will remain for several weeks for consultation with crop specialists and the preparation of his annual report on cooperative cereal investigations at Burns.

R. W. Smith left on January 14 for the Dickinson Substation, Dickinson, N. Dak., after a 6-weeks stay in Washington, during which he completed his annual report on cereal cooperations at Dickinson and assisted in the preparation of material for a Department bulletin on spring wheat in the Northern Great Plains.

Proof of Department Bulletin 823 entitled, "Experiments with Kherson and Sixty-Day Oats," by C. W. Warburton and T. R. Stanton, was read on January 14.

Milton C. Zellmer, who has been conducting plat experiments in the control of take-all and flag smut in Madison County, Ill., has been granted leave without pay, effective at the close of January 15, and continuing till April 30.

VISITORS

E. L. Adams, who was in charge of the cereal experiments at the Judith Basin Substation, Moccasin, Mont., from 1909 to 1911, and of the Biggs Rice Field Station, Biggs, Cal., from 1912 to 1917, was a caller at the Office on January 14 and 15. Mr. Adams is now an extensive and very successful rice grower in the Sacramento Valley, with headquarters at Chico, Cal. In 1919 he grew nearly 1,000 acres of rice.

Dr. B. Gratama, Assistant Commercial Attache, Netherlands Legation, Washington, D. C., called at the office on January 15, to discuss the production of cereals, particularly with reference to the trade in cereals and other seeds for sowing purposes.

George A. G. Herbert, Tarella Farm, Nantawarra, South Australia, a member of the Australian Expeditionary Forces during the world war, called at the office on January 6, to obtain information regarding the principal areas of cereal production in the United States and the experiment stations which are doing important work in cereal improvement. Mr. Herbert plans to spend several weeks in the United States and Canada and will probably visit several of the more important agricultural experiment stations during this time.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North).

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Child). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. A. Mooers). No report.

NORTH CAROLINA

State Experiment Station, West Raleigh, and Substations (G. M. Garren). The counts to determine the percentage of winterkilling and the notes on the general condition of the cooperative experimental plats of wheat and oats on the Piedmont Branch Experiment Station were taken December 30. So far there has been no winterkilling except about 5 per cent of the wheat and 10 per cent of the oats seeded November 15. The seedings of wheat December 1 had not yet germinated. All the plats had been hurt with the cold to the extent of having the tips of the blades killed. All seedings of both wheat and oats after October 15 are very unpromising. Late seeding and continued cool weather afterwards is the explanation of this backward condition.

This condition prevails throughout the wheat-growing sections of the entire State, for the greater portion of the acreage seeded to wheat was late sown. The long continued dry weather of the early and mid-autumn prevented the early preparation of the lands intended for wheat. At one time it looked like the acerage would be very small, but after the rains began there was a considerable seeding of both wheat and rye. The State's Crop Reporting Service reports a decrease of only 11 per cent in the wheat acreage from that of last year. While the present outlook for a good wheat crop from the late seeding is not encouraging, it is possible for favorable weather conditions during the late winter and early spring to produce considerable improvement in the final yields. This has happened many times in the past.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). The minimum temperature for the week ending December 7 was 15°; maximum, 69°; precipitation, 0.83 inch. Maximum temperature for the period from December 8 to 15, inclusive, was 16°, maximum, 64°; precipitation, 1.72 inches. Total precipitation from December 1 to 15, inclusive, 2.55 inches.

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love). (Dec. 1-15)- The notes on wheat hybrids are being taken and much interesting information is being collected. The hybrids which have been sown in the greenhouse are making good growth. Certain F_1 oat hybrids which were made to study the matter

of earliness and winter habit are showing very interesting diversity. Major E. A. Southee from Australia, who served throughout the period of the war, has come to Cornell University to study methods of cereal breeding. Major Southee is now making determinations as to the inheritance of hardness in wheat. We have placed at his disposal a number of hybrids.

Much interest already is being manifested in the new strains of oats which have been developed by the Department and requests are coming in as to source of seed.

The weather has turned very cold, but we are fortunate in that most of the wheat is covered with an inch or two of snow.

(Dec. 16-31). -- The weather for the past two weeks has been rather cold. Nevertheless, there is a good covering of snow on the ground which is of benefit to pastures and fall-sown grain.

The notes on the wheat hybrids grown in the field last summer are nearly completed and work with oats will be begun shortly. The plants for hybridizing and the second generation wheat hybrids are making good growth in the greenhouse.

In a large number of oat tests made in different parts of the State this past year, the new selections developed by this Department have shown up very well. In fact, as a general rule, they have outyielded the local and best commercial sorts.

INDIANA

Indiana Agricultural Experiment Station, La Fayette (George M. Hoffer). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). No report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

GREAT PLAINS AREA (South to North).

TEXAS

Amarillo Cereal Field Station, Amarillo (John F. Ross). No report.

OKLAHOMA

Woodward Field Station, Woodward (John L. Sieglinger). No report.

KANSAS

Fort Hays Branch Station, Hays (A. F. Swanson). No report.

State Experiment Station, Manhattan (John H. Parker). (Dec. 10)-- Freezing weather occurred in all parts of Kansas during the first week in November, with some rain on several days in the eastern part of the State. Soaking rains were general over the eastern two-thirds of the State during the second week in November, with sleet and snow in the western counties. Temperatures were slightly below normal and there was more than the usual amount of cloudy weather. During the third week in November the weather was unusually cold in most parts, with temperatures of from zero to 10° above in the northern and western counties. During the fourth week there was fairly heavy snowfall over nearly the entire State and rather severe weather in some parts. It is believed that the snow will be a benefit to wheat in most cases, as there is from 2 to 4 inches of loose snow covered by a sheet of ice, thus affording the wheat some protection from severe weather.

The State Board of Agriculture report, issued December 4, gives the total acreage sown to winter wheat this fall as nearly 9,000,000 acres. This exceeds by more than 1,000,000 acres the 5-year average for the period from 1910 to 1914, but is 2,500,000 acres or 23 per cent less than the record area of 11,500,000 acres sown a year ago. This reduction in acreage is due to several causes, among which are a disposition to return to a better balanced cropping system, the lack of moisture at seeding time in some localities, shortage of labor, and an uncertainty as to ability to get harvest help next season. The average condition of the growing crop for the State is 79 per cent on the basis of 100 per cent as representing a good stand and an average condition. It is interesting to note that more than 1,000,000 acres are reported as being in volunteer wheat. This is confined almost entirely to the western one-third of the State and is due to natural seeding, caused by grasshoppers cutting off heads after the crop was almost ripe. These volunteer stands are generally thick and the growth rank, but there is uncertainty whether they will withstand the winter as well as wheat on prepared seedbeds.

In the State Board of Agriculture Report of December 11, final estimates are given on the crop yields for 1919 as follows: Total yield of winter wheat, approximately 146,000,000 bushels; of spring wheat, 314,000 bushels. The average yield per acre for the entire State was only 12.5 bushels. This low average yield was due in part to wet weather, lodging, rust, damage by grasshoppers, and particularly in the western part of the State to damage after harvest.

The 1919 wheat crop is the second largest ever grown in Kansas, the crop of 1914 being the only one to surpass it. It is also the largest wheat crop harvested in any State this year. The nearest competitor produced only 38 per cent as much as Kansas.

About 35 per cent of the total wheat crop still remains in the hands of growers. This is due to shortage of transportation facilities and to the fact that in some western counties thrashing is not yet completed, due to the wet

weather, shortage of help and fuel. Considerable of this unthrashed grain has been severely damaged by wet weather.

Approximately 4,000,000 acres were planted to corn in Kansas in 1919 and the total yield was about 63,000,000 bushels, or an average of about 15 bushels per acre. This average yield, though small as compared with yields secured in the corn belt, is larger than in any of the past three years.

About 1,500,000 acres were sown to oats in 1919, with a total yield of 42,000,000 bushels or an average of about 27 bushels per acre, the highest average yield since 1914.

About 500,000 acres were sown to barley in 1919, with a total yield of about 13,000,000 bushels or an average of about 25 bushels per acre. If weight per bushel is considered, the yield of barley in the States compares very favorably with that of oats. The production of barley in Kansas in 1919 is the largest ever recorded.

There were about 27,000 acres sown to rye in 1919, with a total grain yield of about 3,460,000 bushels, or an average of about 13 bushels per acre.

Mr. F. A. Wagner, Superintendent of the Garden City Substation, spent the week of December 8 at Manhattan in conference with members of the experiment station staff and in making plans for experimental work at his station. The work on the irrigated portion of the station is being revised and will include continuous cropping and rotation series with alfalfa, sorghums, sugar beets, winter wheat, and barley. Tests of varieties of corn and the sorghums will be continued on irrigated and dry-land plots and selection work with milo will also be carried on.

Mr. E. S. Wilson of the Agronomy Department spent two weeks in Chicago at the International Hay and Grain Show where he put pu and cared for the Kansas exhibit. Mr. John H. Parker also attended the International Hay and Grain Show in Chicago and a meeting of the Crop Improvement Association men held there on December 2.

This section of the State is experiencing the coldest December on record and the fuel shortage is quite acute. Theaters, churches and schools are closed and the college will close on December 13 to reopen on December 29.

The third-generation wheat hybrids being grown in the greenhouse are making good growth and the first set of notes on vegetative characters has been taken. These have shown that the F_2 classifications made were in the main correct, and that the winter and spring habit is a heritable character. A second and possibly a third set of notes will be taken between now and the last of February.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). No report.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). (Dec. 1-15.) The weather conditions have been unusually severe. The lowest temperature record-

ed previous to December 9 was -18°, but on that date the minimum reached -31°. The maximum for the same date was -8°. On the 13th the minimum was -17° and the maximum was -2°. During the past two weeks there have been 8 days with temperatures of zero or below. The low temperatures have been accompanied by very heavy winds which carried the drifting snow high into the air. There have been but three days during the past two weeks in which any outside work could be accomplished. The winter grains are in good condition, they having been covered with snow.

Notwithstanding the severe weather the water system remained in good working order.

There has been great loss of livestock in nearly all of the eastern part of the State, especially sheep. Cattle and horses were, in most cases, sufficiently strong to withstand the storm. Many herds of sheep were lost from their herders and owners for days at a time. The best of shelter was required to provide adequate protection to animals. As the sheep were on the open range they drifted with the storm. Weather conditions caused the price of hay to raise practically $10.00 per ton.

(Dec. 16-31.) The last half of December was exceptionally fine weather, being springlike in character. The ranges are open and livestock conditions are improved. Losses were enormous during the first half of the month. It was reported that in some of the isolated districts cattle were offered for $10.00 per head.

The precipitation for the month amounted to 0.48 inch, which occurred during the first twelve days. The total annual precipitation for 1919 was 12.33 inches. The precipitation for the first six months was only 2.36 inches. Serious damage to crop yields was caused by the low precipitation; the high evaporation, 41.541 inches, which is nearly one-third above the average; and the heavy rust infection which occurred during July and August.

The bunk and office building is being plastered and the large straw stack with the excess corn fodder of 1918 which was placed under it is being moved from the field and fed to the dry stock and idle horses.

Sheridan Field Station, Sheridan (Leroy D. Willey). No report.

SOUTH DAKOTA

Bellefourche Experiment Farm, Newell (A. L. Ellison). No report.

Cottonwood Substation, Cottonwood (Manley Champlin). No report.

Vivian Substation, Vivian (Manley Champlin). No report.

Eureka Substation, Eureka (Manley Champlin). No report.

Highmore Substation, Highmore (E. S. McFadden). No report.

State Experiment Station, Brookings (Manley Champlin). No report.

NORTH DAKOTA

State Experiment Station, Agricultural College, (Fargo (W. E. Brentzel). Many isolations of organisms causing flax diseases have been made. These are being studied and tested in the greenhouse. It was found necessary to incubate inoculated plants under various constant temperatures in light. To meet these requirements a large glass chamber with connections for controlling the temperature has been provided in the greenhouse.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.). No report.

Dickinson Substation (Ralph W. Smith). No report.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). (Dec. 1-15.) The first two weeks of this month have been very cold, there being only three days when the temperature did not go below zero. On five days, the maximum temperature did not go above zero. On December 2, 3, 8, 9, 10, 11, 12, and 13 the respective minimum temperatures were -28°, -14°, -24°, -33°, -30°, -19°, -19°, and -9°. However, the ground has been covered with 6 or 8 inches of snow during the whole period and it is not probable that the winter wheat has been injured.

So far this month, 0.71 inch of precipitation has fallen all in the form of snow.

Supt. P. V. Cardon left a few days ago for Logan, Utah.

(Dec. 16-31.) The precipitation for December was 0.73 inch, which is 0.02 inch below the average for the past 22 years. The total annual precipitation for 1919 was 9.90 inches, the lowest on record, being about 1 inch more than half of the annual average for the past 22 years. The lowest precipitation for any previous year was 10.42 inches in 1900. The seasonal precipitation this year was 3.00 inches, which is also the lowest on record.

The first two weeks of December were very cold the minimum temperature being -33°, while the latter part of the month was moderate, the minimum being -3° and the maximum 57°. During the good weather of the past two weeks the snow has all melted, leaving the winter wheat subject to the action of the freezing and thawing of the seed bed. Practically all of the snow fell from December 6 to 12. The winter wheat does not show any injury yet, but during the coldest weather the ground was covered with a thick blanket of snow.

WESTERN BASIN AND COAST AREAS
(South to North and West).

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). No report.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). The weather data for the past year has been compiled. This shows that 1919 was the driest year since the Station was established. Precipitation for the year was 6.33 inches. The average annual precipitation for Aberdeen now is 9.18 inches for an 8-year period.

The mountains now, however, are filled with snow to great depths. An excellent supply of irrigation water for next year is assured. Owing to the early deep snows in the hills and mountains many sheep and cattle have been lost, as the owners were unable to get feed to them.

December, 1919, is the coldest December experienced at Aberdeen in the 8 years since the Station was established. On 14 days of the month the temperature was below zero. The coldest temperature reached was -26° on December 13.

The cold weather has brought the rabbits to the irrigated lands for feed. Many thousands of the pests have been overrunning this section. Rabbit drives have been organized and in full operation for the past three weeks. Yesterday one drive netted a few over 8,000 rabbits. On Monday of this week one drive netted 3,500 rabbits. Drives will occur two to three times a week until either the snow or the rabbits give out, for the farmers are after them. School was dismissed yesterday to permit the boys to take part in the drive. It was estimated that 400 people participated. In order that my veracity may not be questioned I will submit photographs in the near future. Many people dropped from exhaustion during the drive because of the rapid work in dealing death to the pests. For real sport and excitement a drive such as occurred yesterday can certainly be recommended.

The Superintendent returned from Twin Falls on December 20. Almost four weeks were spent in assisting in a farm management survey of Twin Falls County, one of the most prosperous irrigated counties in Idaho. Much valuable information was obtained.

On November 21 the Superintendent was called to Blackfoot as an expert witness in a lawsuit involving loss in yield from wheat sold two Aberdeen farmers. Winter wheat was sold instead of spring wheat. The case, Nelson vs. the Farmers Society of Equity, was decided in favor of Nelson and damages to the extent of $1700 awarded. This was the first case to be tried in Idaho under the new seed law.

About the middle of November a trip was made to the recently established High altitude Station at Felt, Idaho. This station comprises 160 acres of good dry land and 40 acres of irrigated bottom land, all of which is located at an elevation of over 6,000 feet. The trip was made at the request of the Director of the Idaho station and was of a supervisory character.

The Idaho Seed Growers Convention will be held at Pocatello January 12 to 16. The convention has been widely advertised and speakers of national reputation have been obtained. In addition to the convention, a seed show will be staged.

OREGON

Harney Branch Station, Burns (Obil Shattuck). No report.

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). The seeding of varieties of cereals in the stripe rust nursery was completed on November 15. As reported under date of November 1, unseasonable rains and shortage of labor to prepare the seed bed delayed the sowing of the rust nursery. It was finally sown under very adverse circumstances and since planting the weather has been unusually cold so that it is very uncertain whether or not any stand at all will result.

The work in the greenhouse has progressed somewhat more favorably, although it has been impossible to get good spore material for culture work on the biological strain problem from as wide a range of sources as desired.

Sherman Co. Branch Station, Moro (F. E. Stephens). December, 1919, was the coldest month since records have been kept in this County. On the night of the 12th, a temperature of -20° was reached. This is 10° colder than the coldest temperature heretofor recorded at the Station. On the 12th, 13th, and 14th, the maximum temperatures were below zero. At the time of this cold weather there were about 18 inches of snow on the ground, so that no damage was done to fall-sown grains. The total precipitation for the month of December was 1.74 inches, nearly all of which was in the form of snow. Before the snow fell, however, the ground was frozen to a depth of about 16 inches. After the 20th, warmer weather prevailed which melted nearly all the snow. The thawing was so gradual that there was very little run-off and most of the moisture was absorbed by the soil. The total precipitation for the calendar year 1919 was 12.72 inches. More than half of this, or 6.52 inches, fell during the four months, from September to December, inclusive.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). The long drought which has prevailed all fall in California has been broken by a general rainfall throughout the State. Most of the summer-fallowed land has long been sown awaiting rain while much of the annually cropped land has awaited a soaking rain to start plowing. The delay in the coming of rain has had a tendency to cause the increase of sowing of barley at the expense of the wheat acreage.

Mr. C. R. Hursh has completed the sowing of rust resistant wheats in rod rows at the following substations: Alturas, Modoc Co.; Burrel, Fresno Co.; Corcoran, Kings Co.; Escondido, San Diego Co.; El Centro, Imperial Co.; University of California Citrus Experiment Station, Riverside Co.; and Winchester, Riverside Co. In the region adjacent to each plot a rust survey resulted in finding grasses and volunteer grain carrying rusts.

W. W. Mackie completed the seeding of the plot of rust resistant wheats at Dodgeland in Butte County. The plots were sown in dry soil as no rain had yet fallen. All the wheat land in the region had been seeded dry. The use of formaldehyde for preventing smut attack has here been abandoned in favor of the bluestone lime dip because of injury resulting when formaldehyde treated seed must remain ungerminated for long periods in dry soil. Stem rust was found in wild oats throughout the region where the irrigation of rice had caused early volunteer growth.

On a recent trip to Humboldt County W. W. Mackie made arrangements with the County Agent to seed two plots with several hundred varieties of oats, one representing the hilly or rolling areas and one the low bottom lands. Stem rust and crown rust of oats are usually epidemic in this region. Crown rust on Holcus lunatus and stem rust on volunteer oats were prevalent at this date.

F. W. Briggs has completed the seeding of several hundred varieties of wheat under smut test at the University Farm at Davis. This sowing made in the dry soil will be followed by a second of the same varieties after the ground has dried sufficiently for planting.

L. Y. Leonard, in charge of the grass garden at Berkeley, has several hundred plots pots of grass seedlings ready to plant in the field. The grass plots will occupy the southwestern portion of the campus. The preparation of the ground is nearly completed.

Plant Introduction Station, Chico (V. H. Florell). (Dec. 1-15.) The foreign nursery wheats and the 1919 baby hybrids were sown on December 8. This completes the sowings of the Garden. It has not been possible to sow the remaining increase Federation wheat which will be sown on Dayton Road about 3 miles from Chico.

There have been a number of rainy days since the first of the month and the weather has been too cold for the germination of the grains. There have also been heavy night freezes with as much as a half inch or more of ice observed on several mornings. The surface soil has been frozen every morning since the last rain and often remains in that condition until about noon.

No germination has been observed on the sowings at the Gardens with few exceptions. A part of Doctor Love's hybrids are starting in pretty good shape and occasionally a few spears are coming in other places where there chanced to be a little moisture at the time of sowing. It is believed, however, that good stands will be secured generally if the weather will warm up as it often does here in the winter season.

The fifth sowing of Doctor Harlan's barley was made today.

Minimum temperature to date, 20° F.

(Dec. 16-31.) During most of the past ten days, a cold, heavy fog has hung over the Sacramento Valley, but with sunshine in the bordering foothills. Although conditions have been unfavorable for germination, those cereals sown before the rains (Nov. 29) began to emerge a few days before Christmas.

Emergence is satisfactory in all classes of grain sown in the nursery excepting a group of miscellaneous wheat where germination appears to be poor. The foreign wheats in the classification nursery and the 1919 baby hybrids sown on December 8 have just emerged and are showing up well.

A fairly good stand of barley in the field plats has also been obtained, except of Zvolanek's Six-Row Hulless. The emergence of wheat in the field plats is unsatisfactory in many varieties, and it may be necessary to resow. It is hoped that warmer weather which is in prospect will bring out the backward varieties.

Mr. E. O. Orpet, head gardener, who has been at the Plant Introduction Garden for about three years resigned, shortly before the Holidays to enter the employ of a commercial colonizing company operating near San Luis Opispo, Cal. The Station has lost a valuable man.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION).

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Vol. 12. January 31, 1920. No. 2.
Personnel (Jan. 16-31) and Project Issue.

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SPECIAL CONTENTS.

Physical Injury to Employees
Formulas for Determining Probable Error
Flax Yields at Fargo, N. Dak.
Inheritance of Disease Resistance and Susceptibility in Flax.
Biologic Specialization and Rust Epidemiology Studies
Leaf Rust Investigations

ERRATA

Through error the pagination of the last issue (Vol. 12, No. 1) was a continuation of that in the issue of Dec. 31 (Vol. 11, No. 26). The pages should have been numbered 1 to 12, inclusive, The paging in the present issue therefore begins with 13.

FIELD STATION REPORTS

It should have been announced earlier that reports from field stations need be sent only at the end of the month during winter. This holds true for February and March. Beginning April 15, semi-monthly reports should be sent.

PERSONNEL ITEMS

During the present epidemic of grippe and influenza, the following members of the Office have been absent: Mr. Chambliss, Mrs. Fishburn, Miss Griffiths, Dr. Harlan, Dr. Humphrey, Miss Hurd, Miss King, Dr. Reed, Mr. Smith, and Miss Stevens; most of whom are now recovered or on the way to recovery.

F. A. Coffman left Washington on January 21, en route for Manhattan, Kansas, with the body of his brother, W. B. Coffman, who died suddenly that morning from pneumonia. W. B. Coffman was an employee of the Land Classification division of the Geological Survey and was in the employe of this office for two or three months last summer.

Mr. Coffman will remain at Manhattan to assist Professor Parker in studies of wheat hybridization until time to return to the Akron Field Station in March.

Dr. R. O. Cromwell, who has been engaged in the investigation of the Septoria disease of cereals in Iowa in cooperation with the Iowa Experiment Station, has resigned, effective January 31, because of shortage of funds to continue this subproject.

Miss Emma Fairchild was appointed stenographer and typist effective January 26, to assist with the clerical and stenographic work incident to the barberry campaign in South Dakota, with headquarters at Brookings.

Miss Frances Feehan, Field Assistant, who since December 1 has been assisting with the cooperative cereal breeding investigations at Cornell University, completed her work on January 31, on which date her appointment was terminated.

Miss Marcellene R. George has resigned, effective February 10, to accept a position with the Goodyear Rubber Company, at Akron, Ohio.

Frank C. Grannis, who has been in charge of Cooperative Cereal Investigations at Knoxville, Tenn., resigned on January 9 to engage in other work.

Dr. F. E. Kempton, Pathologist in charge of the Barberry Eradication campaign, left January 17 on a round trip of the western States in which the barberry eradication campaign is being conducted. He will return about February 20.

A. L. Nelson, Superintendent of the Cheyenne Field Station at Archer, Wyoming, left his station of January 29, en route to Washington for conference and preparation of his annual report.

C. W. Warburton, Agronomist, left Washington on January 23, on an administrative journey, to confer with state, college and experiment station officials concerning cooperative projects in Wyoming, South Dakota, Iowa and Kansas. While in Kansas he will present a paper on "Work of Crop Improvement Associations" before the meeting of the Kansas Crop Improvement Association.

On his return he will inspect the Amarillo Cereal Field Station and will return to Washington on or before February 10.

VISITORS

Dr. A. H. Reginald Buller, Pathologist of the University of Manitoba at Winnipeg, was in Washington from January 28 to 31, in conference with various pathologists and offices.

Jean E. M. Freeman, Chief of the Division of Botany and Plant Pathology, University of Minnesota, was an office visitor on Saturday, January 31, to discuss cooperative investigations in Minnesota.

Dr. H. S. Jackson, Chief of the Botanical Department of Purdue University and leader of the Cooperative investigations of leaf stem rusts in this Office, was in Washington for conference on January 30 and 31.

Dr. L. R. Jones, Chief of the Division of Plant Pathology of the University of Wisconsin, was an office visitor on Saturday, January 31, to discuss cooperative experiments in Wisconsin.

PHYSICAL INJURY TO EMPLOYEES

Under date of January 29, 1920, the following communication was issued by the Chief Clerk of the Department.

"In the matter of reporting to the United States Employees' Compensation Commission cases of injury to employees of the Department, I am in receipt of the following letter from the Commission in reply to my inquiry as to whether such reports should be made direct to the Commission or through official channels:

> 'The Commission is in receipt of your letter of January 17th, concerning the matter of injuries being reported direct by the various field offices under your Department.
>
> 'The majority of the executive departments have issued instructions to their field offices to submit reports and claims for compensation on account of injuries direct to the Commission, thus avoiding the re-handling of such reports. It is noted that a number of the establishments under your Department are now forwarding the reports and claims direct to this office. It would appear desirable that the practice be uniform throughout the establishments, and it is suggested that authorization be given your various bureaus to forward the reports and claims to this Commission direct.'

"In view of the Commission's letter it is recommended that officials in charge of field stations be authorized to forward reports and claims in cases of injury, direct to the Commission.

"In cases of injury occurring in Washington certain Bureaus have been transmitting these papers direct and others through this office. To secure uniformity of practice and save a formal re-handling of papers, it is suggested that you transmit them direct to the Commission.

"(Signed) R. M. Reese, Chief Clerk."

FORMULAS FOR DETERMINING PROBABLE ERROR.

DR. C. E. LEIGHTY, Agronomist.

The formulas used for determining probable errors of the arithmetical mean may be designated as (a) for the formula where probable error equals $0.6745 \sqrt{\frac{\Sigma v^2}{n(n-1)}}$ and (b) where probable error equals $0.8453 \frac{\Sigma v}{n\sqrt{n-1}}$

The formulae (a) and (b) are both derived by Merriman, in "Method of Least Squares". This statement is made by Merriman (Ed. 8, p. 92)in comparing the two formulae, his formula (20) being formula (a):-

> "The method of computing probable errors by formula (20) is that considered the best by all writers. Nevertheless, on account of the labor of forming the squares of the residuals, a simpler and less accurate form is often employed, in which only the residuals themselves are used."

Practically the same mathematical reasoning as that used in computing formula (a) is used in computing the formula (b). The main difference, as I understand it, is that mentioned above, and I do not believe that it is correct to say that formula (b) is incorrect or is an improper one to use.

It is very much easier to compute the probable error by use of the formula in which the sum of the residuals is used, rather than their squares. Tables are at hand for a part of the process which make the computations simple. Therefore, it has seemed to us that this formula was sufficient for our purposes. There is very little difference in the results obtained from the two methods. For instance, I have results before me comparing the two for a series of ten observations and a series of thirty-two observations of plat yields. These are as follows:-

Formula	10 observations	32 observations
(a)	0.56995	0.49643
(b)	0.57528	0.47141

The differences here are so small that they may well be disregarded. As this is generally the case, there seems to be no reason why the more easily calculated formula should not be used.

It seems to me that the greatest defect of our usual determinations of probable errors does not have to do with the formula used, but rather with insufficiency of data. It is presupposed, as a condition in determining either formula for probable error, that the observations shall be sufficient in number to allow free play of the law of chance. Merriman, (p. 95) states on this point, "The formulas for probable error suppose that enough observations are made to exhibit the several residuals according to the law of probability of error." With the few observations on which our probable errors are sometimes determined, and with other factors than chance probably operating, this hypothesis is not fulfilled, and the probable error, as determined, may sometimes be misleading.

211-G. FLAX INVESTIGATIONS.

RESULTS OF EXPERIMENTS AT FARGO, N. DAK.

By Theodore Stoa, Scientific Asst.

1. Varietal Experiments.

Table 1.-- Acre yields in bushels from varieties of flax grown in 1919 in twentieth-acre plats replicated 3 times.

N.Dak. No.	C. I. No.	Variety	Yield per acre, bu. Plat 1	Plat 2	Plat 3	Average	Probable Error.
3082	13	N.Dak.Res.No. 114	19.64	19.17	17.83	18.88	.418
3080	8	N.Dak.Res.No. 52	12.25	12.33	10.29	11.62	.540
1689	12	Primost	10.76	11.62	10.13	10.83	.314
40002	164	(Com.strain)	12.10	8.25	9.11	9.82	.908
40003		(Com.strain)	11.70	6.20	10.45	9.45	1.295
3081	14	N.Dak.Res.No.73	10.29	5.57	8.56	8.14	1.024
49001	165	American Fiber	8.32	4.32	3.61	5.41	1.159
155	17	Frontier	4.95	4.63	3.06	4.21	.458
1133	18	Common	2.27	(a)	(a)	--	
608	1	Sel.Russian	(a)	(a)	(a)	--	
609	45	Sel.Russian	(a)	(a)	(a)	--	
40001		(Com.strain)	(a)	(a)	(a)	--	
1215	3	Damont	(a)	(a)	(a)	--	
1221	16	Select Seed	(a)	(a)	(a)	--	
1214	2	Select Riga	(a)	(a)	(a)	--	
40004	4-1	Mandan	(a)	(a)	(a)	--	

(a) These plats were considered failures on account of extreme wilt conditions, and weeds which later took complete possession of the plats. These plats were not grown in the order indicated here, but were scattered among the other plats throughout the field, indicating a general wilt condition in the soil.

2. Rate-of-Seeding Experiments.

Table 2.-- Acre yields in bushels obtained from flax grown in a rate-of-seeding experiment on twentieth-acre plats, duplicated, in 1919.

Rate seeded pecks.	Yields per acre-bu. Plat 1	Plat 2	Average	Probable Error.
1.0	13.07	13.82	13.44	.312
1.5	14.75	15.89	15.32	.481
2.0	16.10	17.03	16.56	.388
2.5	18.00	17.32	17.66	.287
3.0	18.92	17.82	18.37	.464

The average yields seem to indicate an increasing production as the rate of seeding increases. When the yields of the last 4 years are averaged, however, this is seen to be untrue (See table 3).

Table 3.--Annual and average acre yields of flax in rate-of-seeding experiments in duplicated twentieth-acre plats, during the 4 years from 1916 to 1919, inclusive.

Rate seeded pecks.	Yields per acre, bushels. 1916	1917	1918	1919	Average
1.0	1.9	16.6	20.5	13.44	13.11
1.5	2.9	16.5	21.8	15.32	14.13
2.0	2.5	17.9	22.4	16.56	14.76
2.5	3.9	16.2	22.1	17.66	14.96
3.0	3.1	16.6	22.0	18.37	15.02

From table 3 it is seen that the highest significant yield is produced by the 2-peck rate as the increases above that are not sufficient to recover the extra seed required. Similar results were obtained by the State Agricultural Experiment Station in the years from 1900 to 1902, inclusive.

3. Date-of-Seeding Experiment.

Table 4.-- Acre yields in a date-of-seeding experiment with flax, sown in duplicate twentieth-acre plats in 1919.

Date Seeded.	Yield per acre, bu. Plat 1	Plat 2	Average	Probable error.
April 22	18.10	19.05	18.56	.388
do. 30	15.96	18.32	17.14	.997
May 13	16.57	17.89	17.23	.557
do 20	17.03	15.71	16.37	.557
June 2	10.53	10.67	10.60	.059
do 10	4.28	4.28	4.28	--

4. Tillage Experiments.

Table 5.-- Yields obtained in tillage experiments with flax on duplicate twentieth-acre plats in 1919.

Tillage (a)	Yield per acre, bu. Plat 1	Plate 2	Average	Probable error.
DD. 5/13	16.57	17.89	17.23	.557
DD. 4/30,5/13	18.32	18.57	18.49	.067
DD. 5/20	17.03	15.71	16.37	.557
DD. 4/30;5/13;5/20	17.85	16.10	16.97	.735
DD. 6/2	10.53	10.67	10.60	.059
DD. 4/30;5/13;5/20;6/2	10.85	10.42	10.63	.177
DD. 6/10	4.28	4.28	4.28	--
DD. 4/30;5/13;5/20;6/2;6/10	4.00	4.28	4.14	.118

(a) DD. indicates double disking on the dates given. The plat also was harrowed and seeded on the final date.

PROGRESS REPORT ON INVESTIGATIONS ON INHERITANCE OF DISEASE RESISTANCE AND SUSCEPTIBILITY IN FLAX (January, 1920).

C. M. Woodworth, Assistant Pathologist in Charge.

Introduction.

For the present, these investigations are being confined to a study of the inheritance of resistance and susceptibility to flax wilt (Fusarium lini Bolley). However, as time and opportunity permit, preliminary studies and selections will be made on strains of flax showing resistance to other diseases now of minor economic importance.

Further detailed studies were made during the past season on existing flax varieties and strains as to their relative resistance to wilt. Upwards of a hundred different strains, varieties, and selections were grown on wilt-infested soil at the Field Station, Mandan, North Dakota. Most of them were killed outright by wilt. Only a few showed any resistance at all. Among the completely susceptible strains were practically all those which are being grown commercially and which have shown up well in yield tests. Many of them were selections which are under experiment in the agronomic nursery. It is planned to grow in 1920 all other flax strains which have not yet been grown on wilt infested soil.

Plant Selections.

In 1918, Messrs. Clark and Brinsmade selected nearly 50 plants of a given variety which survived on a wilt-infested plot at the Field Station, Mandan, N. Dak. The seed from these plants was saved separately, and sown on the same plot in the spring of 1919. Counts were made of the total number of plants grown from each selection and the number that died from wilt. The results showed that single plants, apparently equally resistant, differ greatly when the relative resistance of their progenies is used as an index of comparison. Six progenies were killed completely. The rest showed a range of from 1.7 per cent to 58.9 per cent resistance, the average being about 30 per cent.

All resistant plants (numbering about 900) in these progenies were saved separately in order to test them on infested soil the next season.

Certain other single plant selections from the same variety which were not grown on wilt-infested soil the previous year, gave progenies in 1919 which proved to be completely susceptible.

Hybrid Strains from Crosses of Resistant by Susceptible.

Seed from F_1 and F_2 plants furnished by Dr. W. H. Tisdale was grown in wilt-infested soil at Fargo, N. D., during the past season. Most of this seed came from a cross in which the F_1 plants were resistant, and the F_2 generation gave results which could be explained by assuming 4 factors as being

necessary for resistance. It was hoped that by growing a number of F_2 plants data might be secured which would confirm this theory. The result, however, was disappointing. All plants of some progenies were killed by wilt, and in most of the others only a few plants survived. Only 5 or 6 progenies, out of about 50 grown, showed ratios which suggest a Mendelian interpretation All resistant plants were harvested and threshed separately for further tests on wilt-infested soil.

New Crosses.

In the spring of 1919, some crosses were made between resistant and susceptible plants in the greenhouse at Arlington Farm, Virginia. The F_1 plants from these crosses, along with the parent progenies, are now being grown on wilt-infested soil in the greenhouse at Madison, Wisconsin. Some of these hybrids are proving to be resistant, and it is hoped that a study of the F_2 and later generations will throw light on the genetics of wilt resistance.

A number of plants of both the resistant and susceptible strains are now growing on uninfested soil in the same greenhouse, and it is planned to make a large number of crosses between them. Besides the quality of resistance, these strains differ in seed and flower color, and thus it can be noted whether there is correlation between these characters and the factors for resistance.

Natural Cross-Pollination in Flax.

Seedings were made at the Field Station, Mandan, N. D., to determine to what extent cross-pollination occurs in flax. Seeds of a white-flowered type were sown alternately in the row with those of a blue-flowered type, and so close together that the floral branches would intermingle and be in contact, thus furnishing abundant opportunity for natural crossing. It was planned to harvest seed only from the white-flowered plants, keeping separate the bolls as well as the individual plants. Each boll harvested would be used for seed the next year. All seeds producing white-flowered plants would be considered as "selfed", but any seeds producing blue-flowered plants would be hybrid. The proportion of these hybrid seeds would, then, indicate the amount of natural crossing which occurred. Unfortunately, however, the seeds or the very young plants were destroyed by cutworms and the experiment was a failure. Next season it is planned to repeat the experiment, but on a more extensive scale, using several different recessive types, as it is thought that the amount of cross-pollination may be different for each.

Greenhouse Experiments.

Several hundred pounds of soil from wilt-infested plots at Mandan and Fargo, N. D., were shipped to Madison last September for greenhouse experiments. At the present time a number of different strains of flax are under experiment on these soils. These soils are also being compared with each other and with Madison infested soil as to their relative amount of infesta-

tion and their relative "efficiency" in killing susceptible and partially susceptible flax strains. Preliminary experiments indicate that Fargo soil is the most, and Madison soil the least, effective for this purpose. This is important as, ordinarily, in breeding for resistance, the selected strain should be subjected to the most severe conditions obtainable. A test of resistance on Madison soil does not mean nearly as much as a similar test on Fargo or Mandan soil and a strain of flax only partially resistant on Fargo soil would probably be completely resistant on Madison soil. It is realized therefore, that, unless Madison soil becomes more [illegible] tests made on it for resistance must be duplicated at Fargo or Mandan to be conclusive.

218-B. RUST INVESTIGATIONS.

1. STEM RUST (P. graminis).

Dr. E. C. Stakman, Pathologist in Charge.

Biologic Specialization in Puccinia graminis.

The Determination of New Forms. Eighteen strains of Puccinia graminis tritici have been identified and classified during January. Two of the strains contained two biologic forms each. Altogether nine distinct biologic forms of the rust have been isolated, as follows: Form III, four strains; form V, two strains; form IX, one strain; form XIII and XIV, two strains each; form XVII, four strains; form XVIII and XX, one strain each; and form XXIV, three strains.

Origin and Nature of Biologic Forms. Progress but no new results.

The Nature of Rust Resistance.

Work has continued but results capable of analysis and reporting have not yet been attained.

Rust Epidemiology Studies.

The vitality of the urediniospores of Puccinia graminis continues to decrease. The highest percentage of viable urediniospores was in New Mexico. Eighty per cent of the urediniospores of Puccinia graminis tritici were still viable. In northern Texas, Oklahoma, and Missouri about 10% of this form germinated. In the north central west and north central east districts from 0% to 3% of this form were viable. 18% of the urediniospores of Puccinia graminis tritici at Ithaca, N. Y., were still viable and a trace of this form was viable at Corvallis, Ore. A summary of the districts follows:

Northeastern District. The germination studies of the urediniospores of stem and leaf rusts were made at the stations at Ithaca, N. Y. There has been a slight decrease in the viability of the spores during the month. The average percentage of viable urediniospores at this station is as follows: Puccinia graminis tritici 10%, Puccinia graminis secalis 2%, and Puccinia graminis phleipratensis 5%. Urediniospores taken from uredinia under the leaf sheath germinated better than those taken from the surface of the leaf or stem.

North Central East District. Germination tests of uredinial material of stem rust from Barron, Wisconsin, and East Lansing, Michigan were made during the month. The percentage of viable spores decreased about 50% during the month. The average percentage of viable urediniospores from these two stations is as follows: Puccinia graminis (undetermined) 2%, Puccinia graminis tritici 1.3%, Puccinia graminis avenae 2.5%, Puccinia graminis secalis 1.8%, Puccinia graminis phleipratensis 4%, and Puccinia graminis agrostis 1%. Experiments on the effect of light and temperature on the viability of the urediniospores are in progress.

North Central West District. Germination tests of the urediniospores were made from the rust stations at St. Paul. In addition to this germination tests were made from material sent in from Laramie, Wyoming, Fort Collins, Colorado and Lincoln, Nebraska. The average percentage of viable spores from these four States is as follows: Puccinia graminis tritici 3.31%, Puccinia graminis avenae 4%, Puccinia graminis secalis 0, and Puccinia graminis phleipratensis 2%.

The heavy covering of snow in the northern States protected the rust from the low temperatures which prevailed during the month. There has been only a slight decrease in the viability of the urediniospores since the middle of December.

South Central District. Germination tests were made from urediniospore material from Norman, Oklahoma, St. Louis, Missouri, Springfield, Missouri, Amarillo, Texas, Boerne, Texas and State College, New Mexico.

The average percentage of viable spores from the four States in this district is as follows: Puccinia graminis tritici 21.7%, Puccinia graminis avenae 1.5%, Puccinia graminis phleipratensis 3%, and Puccinia graminis .01%.

The viability of the urediniospores continue to decrease. The low temperatures which prevailed during the past six weeks killed most of the rust hosts and at the present time no uredinia can be found on living plants.

Southwest District. Plantings were made at the station at Mesa, Arizona December 12. This station was visited by I. C. Geroge January 12 and no rust could be found on the plants at that time. Plantings which were made at the Tucson station on December 3 showed no rust on January 10. Prof. Mackie reported that the fifteen plots in California were visited and no rust infection on any of the fall planted grain could be found. There was rust, however, on earlier plantings and on volunteer plants in the vicinity of the plots.

Maps showing the locations where stemrust was found in 1919 in California and Arizona were submitted.

Northwest District. Uredinal material of cereal and grass rusts were collected from the stations at Corvallis and Astoria, Oregon and Seattle, Washington. Germination tests were made and the average percentage of viable urediniospores was as follows: Puccinia graminis tritici trace, Puccinia graminis avenae, trace, and Puccinia graminis phleipratensis, 0.

2. LEAF RUSTS.

Dr. H. S. Jackson, in charge, and Dr. E. B. Mains, Assistant.

Investigations were carried out at the Indiana Experiment Station this past season to determine the special relationships of the leaf rusts of grasses and grains of the types of Puccinia triticina, Puccinia secalina, and Puccinia anomala. For such purpose, 166 telial collections upon species of Agropyron, Bromus, Elymus, Hordeum, Hystrix, Puccinellia, Secale, Sitanion, and Triticum, representing 22 species of hosts, were wintered. Of these, 89 collections showed germination and were sown upon various species of Ranunculaceae, Hydrophyllaceae, and Boraginaceae. The aecia thus obtained were then sown upon grasses to determine the grass hosts for the various cultures. The material from these cultures is now being examined and the data classified as a basis for further work this next spring, for which 283 telial collections are wintering at present. With the material thus obtained, it is hoped to establish definite boundaries to the species and biologic forms of these types of rust as they exist in this country.

The uredinial material obtained in the above work, as well as material obtained upon various grasses during the past summer, were carried in culture upon as many grass hosts as possible to determine the host range of the biologic forms. About 75 cultures were thus carried and tested, demonstrating the presence of biologic forms and showing a wide range in the hosts and the host limitations of such forms.

The question of strains of rust on wheat itself has been investigated. About 300 varieties and selections of Triticum aestivum, T. dicoccum, T. durum, T. compactum, T. monococcum, T. polonicum, T. spelta, and T. turgidum have been tested in the greenhouse and from these a set of 19 varieties showing resistance or evidence of usefulness as differential hosts has been selected. These are at present being used as hosts for leaf rust from Montana, Oregon, California, Arizona, Arkansas, Tennessee, North Carolina, Pennsylvania and Indiana, in order to determine the possible presence of strains.

A study of the above cultures of leaf rust of wheat also is being carried on to determine whether other grasses may serve as hosts for the leaf rust of wheat and to what extent. Similar work also is being carried on with the leaf rust of rye.

Besides the greenhouse studies, 218 varieties and selections have been sown at Knoxville and Jackson, Tennessee; Lafayette, Indiana; Bloomington,

Illinois; and Madison, Wisconsin, in cooperation with Professor J. G. Dickson. Notes in regard to disease resistance, especially resistance to leaf rust and scab, will be taken this next spring. Besides the above, 2,000 head rows of 20 varieties have been sown at LaFayette, Indiana, in order to determine whether individuals differ in their susceptibility to leaf rust. Five varieties showing signs of resistance have been placed by Dr. C. E. Leighty in his varietal experiments at Baton Rouge, La., Auburn, Ala., Athens, Ga., Clemson College, S. C., West Raleigh, N. C., and Knoxville, Tenn.

Along with the culture studies, experiments are being carried on to determine the factors favoring and limiting urediniospores and teliospore germination. For the former the various cultures of rust on wheat and other grasses in the greenhouse are being used and for the latter 84 collections of telia from various localities are being employed.

In preparation for the next seasons' work about 2,000 pots are being sown with 35 species of grasses representing 12 genera. For aecial hosts about 65 species representing 13 genera have been acquired and are being wintered in pots for heteroecious cultures next spring.

Mr. Emile Mardfin is assisting with the cultures of the leaf rust of wheat and the urediniospore germination studies. Miss Florence M. Smith is assisting with the microscopic examination of material and with the teliospore germination studies. Mr. F. E. Fuller and Mr. R. O. Cole have assisted in the cultures of wild grass strains.

In carrying out the above experiments, together with certain other rust species occurring on the same generic hosts, about 500 hanging drop cultures for testing spore germination have been made and about 15,000 sowings have been made of the various rusts. Fifty-five species of grasses representing 12 genera have been grown and 65 species of Ranunculaceous and Boraginaceous hosts representing 13 genera have been accumulated and grown.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION).

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Vol. 12. February 29, 1920. No. 3.
Personnel (Feb. 1-29) and Station (Jan. 1-Feb. 15) Issue.

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PERSONNEL ITEMS

Miss Allene Alexander, formerly in charge of property inventory in this Office, was married on January 10 at her home at Greenwood, La., to Mr. Edwin A. Enloe, and will make her home in Shreveport, La., hereafter.

H. Howard Biggar, who has been conducting plat experiments in the investigation of corn root, stalk, and ear rots at Bloomington, Ill., with Mr. J. R. Holbert, has resigned, effective February 15, to accept a position as assistant editor of the Iowa Homestead. His work will be chiefly in Iowa, where he will cover all agricultural meetings of importance and keep in close touch with the various activities of the farm bureaus. Iowa has about 15,000 members in her farm bureaus and it is the intent to keep the Homestead leaders fully informed as to the progress of organized agriculture in Iowa.

P. V. Cardon, formerly superintendent of the Nephi Substation at Nephi, Utah, and at present superintendent of the Judith Basin Substation at Moccasin, Mont., has been appointed agronomist of the Montana college and experiment station and will take up his new duties at Bozeman on March 1. He is succeeded at Moccasin by A. Osenbrug.

A manuscript entitled "Experiments With Flax on Breaking," by Charles H. Clark, formerly assistant agronomist in charge of flax experiments, was submitted to the Chief of the Bureau on February 2 for publication as a Department bulletin.

J. Allen Clark has prepared an article entitled "Spring Wheat Varieties to Grow and Where to Grow Them", which has been approved for publication in the Country Gentleman.

F. A. Coffman, whose journey to Manhattan, Kansas, was recorded in a recent issue, had the misfortune to wrench his back severely while en route and is still suffering from the effects of an internal injury.

Dr. Harry V. Harlan has completed the preparation of an article for the Journal of Agricultural Research entitled "The Development of Barley Kernels in Normal and in Clipped Spikes and the Limitations of Awnless and Hooded Varieties." This was submitted to the Chief of Bureau on February 19.

Miss Annie M. Hurd, who has been engaged on the physiological investigation of the germination of the seeds of wild grasses used in the study of rust epidemiology, transferred on February 16 to the Office of Physiological Investigations, where she will conduct research under the direction of Dr. R. H. True.

Yandle A. Jackson has been appointed as collaborator effective February 11 to assist with the cooperative cereal experiments at Knoxville, Tenn.

Dr. A. G. Johnson, pathologist in charge of the investigation of imperfect and sac fungi, arrived in Washington on February 14. He will spend one month in correlating and tabulating important data on the distribution and prevalence of cereal diseases for Doctor Lyman of the Office of Plant Disease Survey.

Dr. F. E. Kempton, pathologist in Charge of Barberry Eradication, returned February 14 from a month's field trip, during which he visited eleven of the thirteen states in which barberry eradication is being carried on and conferred with local officials regarding the progress of the campaign. He reports that the campaign has progressed even beyond his expectations, and that he finds hearty cooperation and a strong demand for the continuation of the work. The results show that while the greater part of the barberries located so far have been eradicated, thousands of bushes are growing on farms as ornamentals and the shrub has escaped from cultivation to an alarming extent. To complete the campaign, every farm in the thirteen States must be carefully inspected for barberries.

Dr. C. E. Leighty has prepared an article entitled "Natural Wheat-Rye Hybrids of 1918," which has been approved for publication in the Journal of Heredity.

E. S. McFadden and Mrs. McFadden left Washington on February 4 on their return journey to South Dakota. En route, Mr. McFadden will visit the Minnesota experiment station to discuss future work in cereal breeding and will then proceed to the South Dakota experiment station at Brookings, where he will confer with Professor Champlin and others regarding the work of the coming year at the Highmore Substation. He will return to Highmore about March 1.

R. W. May, scientific assistant in charge of cereal investigations at the Judith Basin Substation, Moccasin, Mont., left for Moccasin on February 25, having spent six weeks in Washington in the preparation of his annual report

and in consultation with crop specialists regarding cereal experiments on the Judith Basin Substation.

A. L. Nelson, superintendent of the Cheyenne Experiment Farm at Cheyenne, Wyo., arrived in Washington with Mrs. Nelson on February 3 to prepare his annual report and confer concerning plans for the coming season. Mr. and Mrs. Nelson left Washington February 23 on the return trip to Cheyenne.

A manuscript entitled "Milo, A Valuable Grain Crop," has been completed by B. E. Rothgeb, assistant agronomist in charge of grain sorghum and broomcorn investigations. This was submitted to the Chief of Bureau for publication on February 21.

Page proof of Department Bulletin 836, "Broom Corn Experiments at Woodward, Okla.," by Benton E. Rothgeb and John B. Sieglinger, was read on February 17.

Obil Shattuck, superintendent of the Harney County Dry Farming Substation, Burns, Oreg., and Mrs. Shattuck left Washington on February 22 to return to Burns, after having spent six weeks in Washington, where Mr. Shattuck completed the preparation of his annual report and consulted with crop specialists.

John B. Sieglinger, assistant agriculturist in charge of cereal experiments on the Woodward Field Station, Woodward, Okla., has prepared a brief article entitled "Temporary Roots of the Sorghums," which has been approved for publication in the Journal of the American Society of Agronomy.

A. F. Swanson, scientific assistant in charge of cereal experiments at the Hays Branch Station, Hays, Kans., who has been in Washington since about December 1, left for his station on February 21, En route he will stop at Manhattan, Kans., to consult with farm crop specialists regarding the cereal experiments at Hays.

C. W. Warburton returned on February 12 from his western field trip, during which he visited Iowa, Kansas, Oklahoma, South Dakota, Texas, and Wyoming. Conferences were held with State experiment station officials in Iowa, Kansas, South Dakota, and Wyoming with reference to cooperative cereal experiments, and in South Dakota and Wyoming with extension and other officials regarding the conduct of the barberry eradication campaign. Plans for cereal experiments during the coming year at Amarillo Cereal Field Station and the Woodward Field Station were discussed with representatives of the Office at those stations.

The February issue of the Journal of the American Society of Agronomy contains a paper entitled "Federal Seed Grain Loans," by C. W. Warburton. This is a brief report of the loans which were made to farmers in the semiarid Northwest and Southwest in the fall of 1918 and the spring of 1919.

Page proof of Department Bulletin 823, entitled "Experiments With Kherson and Sixty-Day Oats," by C. W. Warburton and T. R. Stanton, was read on February 13.

Dr. W. H. Weston has completed two years' investigation of downy mildews in the Philippine Islands and will soon return to this country for conference and preparation of additional papers for publication. He hopes to catch the February transport from Manila. He has made some very striking discoveries in connection with the life history of the Oriental downy mildews and already has one paper in press.

Revised copy for Farmers' Bulletin 554, "Popcorn for the Market," by J. G. Willier, was submitted to the Chief of the Bureau on February 5.

VISITORS

Stanislas J. Arct of the Ministry of Food, Warsaw, Poland, was an office visitor on February 21. He discussed cereal varieties with the various crop specialists and obtained a number of samples for trial in Poland.

Captain W. R. Birks, Chatswood, New South Wales, Australia, was an office visitor from February 25 to 27. Captain Birks has been absent from Australia for nearly 5 years, being connected with the British army on the western front in France during most of this time. Since the signing of the Armistice he has spent considerable time in studying agricultural conditions in Europe. He has studied at Cambridge, and at the Svalof Plant Breeding Station in Sweden. He has recently visited the Central Experimental Farms at Ottawa, Canada. Captain Birks expects to spend several weeks visiting experiment stations and agricultural colleges in the western United States, and will sail for Australia from Vancouver. Before entering the army, Captain Birks had charge of the stud plats of wheat grown in cooperative trials with farmers for the Cowra Experiment Farm. From Captain Birks' stud plats the Hard Federation variety became established commercially in Australia. Captain Birks was much interested in the success of this variety in sections of the Pacific Coast area of the United States.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North).

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). (Jan. 15.) Prof. S. H. Essary left January 14 for Madison, Wisc., where he will conduct some experiments with Dr. L. R. Jones on Fusarium diseases of several crops, particularly tomatoes. He expects to return about March 15.

Work is progressing slowly with the isolation and testing of organisms

causing corn root, stalk and ear rots,

(Jan. 31.) The isolation of Fusaria causing the corn root rot has been continued. Twenty-seven pedigree cultures from different localities are being fairly well distributed throughout the State, on inbred wheat. Their pathogenicity and virulence will be tested as soon as they have grown sufficiently.

(Feb. 15). The 27 cultures of Fusaria noted in the previous report as isolated from diseased corn grown in all parts of the State, have been tested for pathogenicity and virulency. Twenty-five are certainly pathogenic and the other two questionably so. Five are extremely virulent; three of these are from adjoining counties. Tests to indicate possible identity are now under way.

NORTH CAROLINA

State Experiment Station, West Raleigh, and Substations (G. M. Garren). No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). Unusually cold weather has occurred during the two past months. The cold spells were of longer duration than is usually the case in this section and were as a rule accompanied by strong winds. The lowest temperature occurred December 2, when a minimum of 2° was recorded. The maximum for the same month was 69°.

Wheat, oats, and barley both in the nurseries and plats show more winter injury than is normally the case at this season. The injury consists largely in the killing back of the leaves, and a small amount of heaving.

NEW YORK

Cornell University Experiment Station, Ithaca (E. E. Kaws). (W. T. Craig). (Feb. 3.) The weather has been very cold during the past week, the lowest temperature being -16°. Wheat is well covered with snow, so that no injury to it is expected.

The taking of data on wheat hybrids grown at Ithaca has been completed. The wheat hybrids grown in California are now being studied and some very interesting data are being obtained, especially from spelt-club crosses. The pure-line statistical and the Montana cooperative work is almost completed and the preparation of seed for spring planting will soon begin.

At present, we are installing a cereal exhibit for Farmers' Week, to be held here February 9 to 13. A record attendance is expected this year. Doctor Love has been confined to his home for the past two weeks with grippe and quinsy, but is now recovering and it is hoped will be able to take his usual part in the Farmers' Week activities.

INDIANA

Indiana Agricultural Experiment Station, La Fayette (George M. Hoffer). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). No report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

GREAT PLAINS AREA (South to North).

TEXAS

Amarillo Cereal Field Station, Amarillo (John F. Ross). No report.

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). No report.

KANSAS

Fort Hays Branch Station, Hays (A. F. Swanson). No report.

State Experiment Station, Manhattan (John H. Parker). No report.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). No report.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). (Jan. 16.) The weather has been milder during the past two weeks than during the last half of November and the month of December. The thawing during the day and freezing at night has killed a large percentage of the fall wheat sown on fallow. In connection with the heavy wind which is now blowing the soil, this may cause the loss of all grain on fallow. The fall grain sown on oat stubble is in very much better condition, due to the short stubble clumps of Russian thistle and the thin oat stubble, which hold the snow and the crop.

During the past two weeks livestock conditions have greatly improved and feed has decreased in price to some extent.

The plastering of the bunk house has been completed and new casings are ready to be put on.

Sheridan Field Station, Sheridan (Leroy I. Willey). No report.

SOUTH DAKOTA

Belle Fourche Experiment Farm, Newell (A. L. Ellison). No report.

Cottonwood Substation, Cottonwood (Manley Champlin). No report.

Vivian Substation, Vivian (Manley Champlin). No report.

Eureka Substation, Eureka (Manley Champlin). No report.

Highmore Substation, Highmore (E. S. McFadden). No report.

State Experiment Station, Brookings (Manley Champlin). No report.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo, (W. E. Brentzel). No report.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.). No report.

Dickinson Substation (Ralph W. Smith). (Jan. 17.) Superintendent Lehoy Moomaw left for Washington on January 10.

Snow has been falling here to-day. Since early in November there has been but little snow here, but considerable fell previous to that time.

The total precipitation for the year 1919 at Dickinson was 8.35 inches, which was the lowest in 28 years.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). No report.

WESTERN BASIN AND COAST AREAS
(South to North and West).

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). No report.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Harney Branch Station, Burns (Obil Shattuck). No report.

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman Co. Branch Station, Moro (L. E. Stephens). (Feb. 17). After a long and rather severe winter for this country, the weather has moderated and the ground is drying rapidly. Fall-sown wheats were injured but little. The wheat sown late in the fall has not yet emerged and probably never will. Wheat sown on our latest date of sowing (October 31) is not yet through the ground. Most of the farmers in this section, however, sowed wheat rather early and have secured good stands

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). (Jan. 20.) Dr. P. B. Kennedy and Dr. L. Y. Leonard have germinated several hundred pots of grasses in the greenhouse. These are being planted in the grass garden on the campus. Before planting, Mr. Kennedy is making careful records of the vegetative characters of each species in its seedling state in order to compile data for a key to be used in identifying species in their seedling stages.

F. N. Briggs and W. W. Mackie have completed the sowing of the smut and rust resistant varietal plots at Salinas and Davis. Various seed treatment tests with bunt yet remain to be completed at Davis.

Soil at Kearney Park, badly infested with bunt for several years, is being used to test the efficacy of various seed treatments.

Plantings at the rust substations at McArthur, Shasta Co.; Calipatria, Imperial Co.; and Eureka, Humboldt Co.; have been completed.

The excessively dry and cold season which has prevailed over the State has settled into dry and warm weather. All cereal crops and grasses are backward. Reports from the substations show that little growth has occurred. Late plantings at Davis and Salinas, and all plantings on unirrigated soil at Fresno, Burrel, and Corcoran have not yet germinated.

Mr. Ruth F. Allen has secured some interesting results showing the behavior of stem-rust mycelium when attacking resistant and non-resistant wheat hosts.

Plant Introduction Station, Chico (V. H. Florell). (Jan. 15.) Pleasant weather with clear skies has prevailed since the first of the year. The wheat varieties in the plat experiments have emerged with very non-uniform stands, ranging from fair in about half of the varieties to almost nothing in others. Half of the entire block has been picked for reseeding, while those varieties on the remaining half which show positively unsatisfactory stands also will be resown. One variety of barley, Svalöf's Six-Row Hullless, will also be resown. It is planned to do this work within the next two days. A block of five varieties of increase miscellaneous wheats in the nursery was resown yesterday. The remaining cereals are making good growth.

(Jan. 31.) The wheat in the field varietal experiment resown on January 16 emerged on January 30 with good stands. Sowings reported emerged previously are becoming well established. The increase fields on Dayton Road sown on January 6 and 7 were emerging satisfactorily on January 27. At that date a small part had emerged, with the remainder in advanced stages of germination.

The weather continues dry, with less than 6 inches of rainfall since November 29. Rice men and orchardists are becoming worried at the prospect of a water shortage next summer.

Much wheat and barley was sown by farmers during January. Some plowing for grain is yet being done, but practically all is for barley. Early sown fields are greening up nicely, while most of the January sowings are emerging satisfactorily. The season is especially favorable for grain sown on the adobe, as there is no surplus moisture to interfere with growth.

The University Farm at Davis was visited on January 27. Grain sowings there made early in January were just emerging.

(Feb. 16.) The midmonthly sowing of Dr. Harlan's barleys was made on February 14. The sowings since the beginning of the year have emerged more promptly than the earlier ones, and also show more variation in the date of emergence of varieties. A satisfactory emergence has been observed in these sowings. The late semimonthly date-of-seeding varieties of wheat and oats have emerged unsatisfactorily. This condition is due in part to the drought and the depredations of meadow larks. The oats apparently are low in viability. The barley of this series also has been slightly injured by the larks. Good stands of flax have been obtained.

Notes on manner of growth, color, and width of leaf were taken on cereal varieties last week. In the foreign classification nursery some very interesting plant characters were noted in connection with the source of varieties. The varieties are grouped according to countries. The habits of growth of the young plants in some groups xshow a striking adaptation to the climates in which they have been grown. Varieties from semitropical countries (such as India, Egypt, Algeria) grow strongly erect with medium to wide leaves, and are invariably light green in color. Most of those from temperate countries (such as France, England, Rumania) have a spreading to intermediate habit of growth, with occasional erect forms. The leaves are narrow to medium in width and dark green to green in color. In varieties from the colder countries (such as Canada) the habit of growth is erect, often with a slight tendency to spread, occasional varieties being spreading in habit. The leaves are medium in width, in a few cases tending towards wide. The color is mostly green to light green. In mountainous countries (such as Mexico, Abyssinia) the plants show considerable variation, from erect to spreading, light green to dark green, and wide to narrow leaved.

With a proper interpretation of the above characters it might be possible to gain a fairly good idea as to the adaptability of varieties. One can also get a fairly definite idea as to the climatic conditions and topography of the country where varieties have been grown.

Winter grains over the valley are generally in good condition. Rain, however, is needed. Late-sown grains show poor germination in the heavier soils.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION)

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Vol. 12. March 15, 1920. No. 4.
Personnel (March 1-15) and Station (Feb. 16-March 15) Issue.

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PERSONNEL ITEMS

H. Howard Biggar, whose resignation to accept a position with the Iowa Homestead was reported in the Cereal Courier of February 15, has withdrawn his resignation and will retain his connection with the corn root, stalk, and ear rot investigations at Bloomington, Ill.

Charles E. Chambliss left Washington March 9 with two representatives of the Bureau of Markets and one from the Solicitor's Office for an extended trip in connection with the public hearings on the proposed grades for milling rice. Hearings will be held in Charleston, S. C., New Orleans, La., Beaumont, Tex., San Francisco, Cal., Chicago, Ill., Cleveland, Ohio, and New York City. Mr. Chambliss will return about March 25.

Ross R. Childs, agent in charge of cooperative cereal experiments in Georgia, was a visitor at the office on March 15. Mr. Childs will be in Washington about two weeks in connection with cotton grading studies in the Bureau of Markets.

A manuscript entitled "Experiments With Australian Wheat Varieties in the Pacific Coast Area," by J. Allen Clark, David E. Stephens, and Victor H. Florell, was submitted for publication as a Department Bulletin on March 9.

W. C. Eldredge, scientific assistant in eastern wheat investigations, has resigned, effective March 22, to accept a position with Mr. E. L. Adams, who has extensive rice-growing interests in California. Mr. Adams was for several years in charge of the Biggs Rice Field Station, Biggs, Cal., for this office, and previous to that time was in charge of cereal experiments at the Judith Basin Substation.

A paper entitled "The Occurrence of the Fixed Intermediate Hordeum intermedium haxtoni in Crosses between H. vulgare pallidum and H. distichon palmella," by Harry V. Harlan and H. K. Hayes, has been approved for publication in the Journal of Agricultural Research.

A paper entitled "Germination of Barley Pollen," by Stephen B. Anthony and Harry V. Harlan, was published in the Journal of Agricultural Research, vol. 18, no. 10, pp. 525-536, under date of February 16.

Copy for the revised edition of Farmers' Bulletin 554, "Popcorn in the Home," by C. P. Hartley and J. G. Willier, was submitted to the Chief of Bureau on March 15.

G. N. Hoffer, agent and pathologist in charge of investigations of the Fusarium rots of corn, in cooperation with the Indiana Agricultural Experiment Station, was in Washington on February 24 to attend the European corn-borer quarantine hearings and to consult regarding corn disease studies.

A paper entitled "Rust in Seed Wheat and Its Relation to Seedling Infection," by C. W. Hungerford, formerly assistant pathologist, has been approved for publication in the Journal of Agricultural Research.

A paper entitled "Treatment of Cereal Seeds by Dry Heat," by D. Atanasoff and A. G. Johnson, was published in the Journal of Agricultural Research, vol. 18, no. 7, pp. 379-390, under date of January 2.

Copy for a revised edition of Farmers' Bulletin 729, "Cultivation of Corn In the Southeastern States," by C. H. Kyle, was submitted to the Chief of Bureau on March 10.

Stephen M. Spangler has been appointed collaborator effective March 16, to assist with the cooperative cereal experiments at Knoxville, Tenn., succeeding Yandle A. Jackson.

Galley proof of Farmers' Bulletin 1122, "The Brown Spot Disease of Corn With Suggestions For Its Control" by W. H. Tisdale, was read on March 13.

An article entitled "Getting the Most Out of Oats," by C. W. Warburton, was published on page 45 of the Country Gentleman of March 6.

Dr. W. H. Weston, who has been engaged in a study of downy mildews and other corn diseases in the Philippines for the past two years, sailed from Manila March 15 for the United States on the transport Logan.

E. Mead Wilcox, former botanist of the Nebraska College of Agriculture and State Leader of the barberry eradication campaign, was in Washington on March 3 en route to Santo Domingo, where he will become director of the Santo Domingo Experiment Station.

C. G. Woodbury, director of the Indiana Agricultural Experiment Station, was an office visitor on March 2 to 4, for consultation regarding cooperative studies of corn diseases.

VISITORS

Stephen Chase, superintendent of the McDonogh School Farm, McDonogh, Md., was a visitor at the office on March 17.

Messrs. Mannerheim and Storrjohann of Sweden, were office visitors on March 5. They were particularly interested in varieties of cereals and forage crops suitable for silage production.

Prof. R. D. Watt, economic botanist, Sydney University, Sydney, Australia, who is en route to Scotland on leave, was a visitor at the office March 12 and 13.

CHANGE IN DATES OF ISSUE.

The next issue of the Cereal Courier will be edited March 31, and will contain such field station and project reports as are on hand at that time, together with a list of the manuscripts which have been submitted for publication by members of the Office of Cereal Investigations since July 1, 1919, with the present status of these manuscripts.

Beginning with April 10, the Cereal Courier will be issued at 10-day intervals, as was done during 1919. The issue appearing on the 10th of the month will contain field station reports for the last half of the preceding month. The issue appearing on the 20th will contain field station reports for the first half of the current month, while the issue appearing on the 30th will contain project reports. Personnel items covering the 10 days immediately preceding publication will be included in each issue. Field men are requested to send station reports promptly on the 1st and 15th of each month, so that there may be as little delay as possible in the issuance of the Courier.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North).

LOUISIANA

Crowley Rice Station, Crowley, (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). No report.

NORTH CAROLINA

State Experiment Station, West Raleigh, and Substations (G. M. Garren). No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). No report.

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love). (March 12). The immense amount of snow we have had throughout the State has remained until the present date. From March 8 to 12 the weather has been warmer and the snow is now melting. Fall-sown grains and meadows should be in good condition unless we have too much freezing and thawing during the remainder of March.

We are now busy getting out the grain and making plans for spring seeding. According to the present outlook, we will have about the same amount of material in the way of spring grains as we had last year. Lack of assistance and funds is keeping us from increasing this work. The wheat hybrids sown in the greenhouse are now heading out and furnishing new material of interest.

There has been an unusual demand for seed oats of our improved strains this year. As the tests conducted in various parts of the State are indicating their superiority the farmers are very anxious to obtain seed. The supply of Selection 123-5 is exhausted and requests are still coming in for more seed.

During Farmers' Week there was much interest displayed by the farmers in obtaining improved seed of various grains. Representatives of certain seed houses were also here, indicating their interest in following our work. Captain W. I. Birks of Australia visited the University recently, looking over the work of the department, but was especially interested in small grain problems.

INDIANA

Indiana Agricultural Experiment Station, Lafayette (George M. Hoffer). (March 6.) The work which is being conducted at the present time at Lafayette, Ind. and cooperating stations consists primarily in testing seed ears for the experimental plats next summer.

New Rag-Doll Germinator. A modified rag-doll type of germinator has been developed and will presently be described by B. H. Duddleston in a cooperative bulletin to be issued by the Purdue University Agricultural Experiment Station. The modified rag doll is very similar to the old type, but has been improved by the addition of an insulating sheet of pearl wash glazed butcher's fiber paper. This paper serves to prevent the spread, through the cloth of the doll, of the organisms which are carried by infested seed ears and which cause root rots of the corn plants. The paper also serves to better aerate the seedlings. This results in a very good method for determining accurately the germination capacities of the kernels.

The infested ears can be detected readily by placing eight to ten kernels in a row across the cloth. The doll, after being rolled, is placed on end in a specially devised germinator box. The kernels are placed on the doll so that the tips all point downwards when the doll is placed in the germinator box. The organisms carried on the infested ears do not spread sufficiently to infect the adjacent rows of seedlings under this arrangement and the rows of diseased seedlings stand out sharply. The infested seedlings can be noted readily after the doll has been in the germinator box for 7 days at approximately 85° F. with constant moisture.

The modified doll as developed enables the operator to make germination tests on a large scale. An experimental testing station is being conducted in cooperation with the Shelby County, Ind., Farmers' Association, and the system is more than fulfilling expectations. The use of the germinator box enables seven hundred ears to be tested at a time under identical conditions of temperature and humidity, and at no expense other than keeping a box 18 x 30 x 20 inches in size heated to 85° F. Three such boxes are in use at Shelbyville, Ind.

The first series of readings has been made this week and the results show that from 15 to 19 per cent of the ears which have been selected by the farmers are being discarded because of organisms which cause root infections (Fusarium spp., principally). These discards are in addition to the 13 per-cent of ears which have not been considered because they showed dead kernels. These latter ears could have been detected in any germination test but the former could not.

Data from 1919 Experimental Plats. The experimental data from last year plats is showing some interesting results. Mr. Glenn M. Smith has briefly summarized the sweet corn results to show the differences in yield between the ears which when germinated showed infections and those which were disease-free as follows; the differences in all cases being in favor of the disease-free seed.

Leonard Seed Co., Chicago, Ill. Narrow Grain Evergreen, 10 rows disease corn and 40 rows disease-free corn show 16.0 per cent difference.

n Ferry Seed Co., Rochester, Mich., Country Gentleman, 30 rows disease-fr corn and 10 rows diseased corn show 14.1 per cent difference.

H. J. Sconce, Sidell, Ill., Golden Bantam, 40 rows disease-free corn and 10 rows diseased corn show 103.8 per cent difference.

Iowa Agricultural Experiment Station, Truck Crops Section, Ames, Iowa, Connecticut Stowell's Evergreen, 25 rows disease-free corn and 25 rows diseased corn show 22.4 per cent difference.

Iowa Agricultural Experiment Station, Truck Crops Section, Ames, Iowa, Iowa Stowell's Evergreen, 25 rows disease-free corn and 25 rows diseased corn show 15.7 difference.

Professor C. R. Orton, State College, Pa., reports the results of the State College experimental plat of White Cap Leaming Corn, where 16 rows of disease-free corn and 16 rows diseased corn show a difference of 13.0 per cent.

These results show very well that the germinator results can be interpreted so that the relative yielding capacities of seed ears can be estimated. Omitting the results from the Golden Bantam plat, it is seen that 136 ears of disease-free corn which were used in the other plats compared with the 86 ears which germinated approximately 100 per cent but which showed infection on the germinator, outyielded the diseased ones by 16.2 per cent.

News Notes. Glenn M. Smith is at present (March 4) at Grass Lake, Mich., assisting Mr. George Starr, of the Jerome B. Rice Seed Company, in germinating the different varieties of sweet corn seed to be used in the experimental plats this summer. En route home he will visit the D. M. Ferry Seed Company, Detroit, Mich., and make necessary plans for the experimental plats at Rochester, Mich.

B. H. Duddleston and John F. Trost are supervising the cooperative work in Shelby County, Ind. One of these men is present each week on the days when the germinators are read so that, by constant supervision, the tested ears can be properly bulked for the experimental plats next summer. In all cases the disease-free corn will be checked against the ears germinating 100 per cent but which show infection. At least four rows in each experimental field will be planted from these infected ears. The farmers are very much interested in the work and between 30 and 40 bulk plantings will be made, distributed in all parts of the county.

In the greenhouse soil and fertilizer experiments are conducted to study the role of metallic salts and their effect on the metabolism of the corn plant.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). Leroy Compton, who was formerly in the employ of this office in wheat scab investigations, visited the office at Bloomington on March 8. Mr. Compton is now at Bourbon, Ind., where he is engaged in truck farming on some of the muck land near there.

Messrs. Holbert and Diggar attended Farmers' Institute at the Ben Funk Consolidated School near Shirley on February 26. Several of the faculty of the University of Illinois were present as well as Farm Adviser Center and

Associate Adviser Farrenkopf of McLean County. The corn root and stalk rot lantern slides were shown there and attracted much favorable comment.

This county has a new Associate Farm Adviser, Mr. Harrison Farrenkopf, who is the specialist in soils and crops, and for the past seven years has been connected with soil experiments for the University of Illinois.

County Farm Adviser Chester Starr of Tazewell County was in Bloomington February 25, bringing twenty-five members of his 100-bushel corn club. The men were given a chance to see the germinations we are conducting and also the pictures and paintings of our investigations. These men all intend to test for disease the corn they use in the contest and plant only apparently disease-free seed.

We have an exceptionally fine germination room for testing ears for disease. A fairly constant temperature can be maintained and the results secured have been splendid. Approximately 3,000 ears of corn have been carefully tested for disease at this writing. Besides our corn for investigational purposes, germinations are being made for the University of Illinois, Universit of Wisconsin, and the Kansas State Agricultural College.

The lantern slides illustrating the corn root and stalk rot investigations as carried on here, have been shown at the following places: Farmers' Week at the University of Illinois; Farmers' meetings at Bloomington, Pontiac, Chenoa, Shirley, Decatur, Amboy, Galesburg, and other places in the State. Professor J. C. Hackleman, of the Illinois Agricultural Experiment Station, also has used the corn root and stalk rot slides on several different occasions this winter. There are over one hundred slides, most of which are beautifully colored.

Corn exhibits representing many different varieties grown on our plots have been furnished this winter to the University of Wisconsin, Professor J. H. Parker of the Kansas Agricultural Experiment Station, J. H. Weghorst of DeGraff, Ohio, D. Brooks Hogan of Oswego, Oregon, the Lewis Seed Company of Media, Ill., and the Field Museum of Chicago, Ill.

Messrs. Holbert and Biggar are preparing a manuscript on the Relation of Early Vigor of the Corn Plant to Harvest Performance.

Professor G. N. Hoffer was at Bloomington March 10 for conference relativ to the preparation of a Farmers' Bulletin on the Corn Root and Stalk Rots.

WISCONSIN
Agricultural Experiment Station, Madison (J. G. Dickson). No report.

MISSOURI
State Experiment Station, Columbia (L. J. Stadler). No report.

IOWA
Agricultural Experiment Station, Ames (L. C. Burnett). No report.

GREAT PLAINS AREA (South to North).

TEXAS

Amarillo Cereal Field Station, Amarillo (John F. Ross). (March 6). The weather data for December, 1919, are as follows: Maximum temperature, 73° on the 11th; minimum, -2° on the 8th; hourly wind velocity 6.1 miles; and precipitation, 0.95 inch.

For January, 1920: Maximum temperature, 72° on the 19th; minimum, 1° on the 8th; average hourly wind velocity, 6.3 miles; and precipitation, 0.57 inch. The precipitation recorded at the Weather Bureau down town for the same time was 1.11 inches.

For February, 1920: Maximum temperature, 78° on the 22d; minimum, 10° on the 28th; average hourly wind velocity, 7.1 miles; and precipitation, 0.08 inch.

Much of the moisture for the last three months came as snow and stayed on the ground in drifts for many days at a time. The drifts were especially bad around the shocks of grain sorghum still in the field and thrashing was greatly delayed. The thrashing of the experimental plats was finished on February 26.

There is plenty of moisture in the soil for present needs and the ground is in good condition for spring seeding.

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). (March 4). Wheat in general is not looking very strong in this section, as the cold weather which occurred during the latter part of November stopped the growth of wheat. Since then it has been rather dry, so wheat has done well to hold its own. The wheat in the varietal experiment on the station shows varying percentages of winterkilling. The relative appearances of the plats at present are: Nebraska Hybrid No. 28, best; Kanred, 2d; Kharkov, 3d; Clarks' Blackhull, 4th; Harvest Queen, 5th; and Red Rock, poorest.

During February sorghum hybrids have been selected for seed, broomcorn seed heads thrashed, seed sent out, and some greenhouse work has been done.

At present, a heavy wind is blowing from the Northwest. The soil is dry on top and clouds of dust are blown off cultivated ground. Additional moisture would be beneficial.

Maximum temperature for February, 76° on the 8th; minimum 11° on the 29th; precipitation, 0.07 inch (snow) on the 3d.

KANSAS

Fort Hays Branch Station, Hays (A. F. Swanson). No report.

State Experiment Station, Manhattan (John H. Parker). No report.

CLAIMS ACTS (Crown as party).

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). No report.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). No report.

Sheridan Field Station, Sheridan (Leroy D. Willey). No report.

SOUTH DAKOTA

Bellefourche Experiment Farm, Newell (A. L. Ellison). No report.

Cottonwood Substation, Cottonwood (Manley Champlin). No report.

Vivian Substation, Vivian (Manley Champlin). No report.

Eureka Substation, Eureka (Manley Champlin). No report.

Highmore Substation, Highmore (E. S. McFadden). No report.

State Experiment Station, Brookings (Manley Champlin). No report.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzel). Further efforts to isolate a causal organism from cankered flax plants collected last summer at Fargo and Mandan, N. Dak., and Winnipeg, Canada, have been unsuccessful. A nonparasitic type fof flax canker appears to have been rather common in these localities last summer.

A large number of cultures of Fusarium have been taken from wilted flax plants. These were quite generally obtained from plants growing in North Dakota. However, several specimens of wilted plants have been received from Minnesota and Montana from which isolations have been made. From these cultures, and many others obtained from several of the States and Canada, purified cultures have been made from single spores. They are being studied and the work of inoculation is now in progress.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.) No report.

Dickinson Substation (Ralph W. Smith). (February 28). The weather during the past two months has been comparatively mild, with unusually light snowfall. The precipitation for January was 0.11 inch and that for February only 0.04 inch.

The ground has been practically bare since December. There is not much winter grain above ground to be affected by this lack of winter protection. The acreage sown to winter rye in this district was rather small, due to the dryness of the soil and the fear of grasshoppers. Much of that sown did not emerge because of the dryness of the soil.

Superintendent Le Roy Moomaw returned to the station February 27, after being in Washington for a few weeks.

There is considerable demand from farmers in this locality for information regarding adapted corn varieties, silos, cultural methods with corn, and hardy varieties of corn are in demand for seed. There is a prospect for an enlarged acreage of corn and correspondingly smaller acreage of small grain.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). No report.

WESTERN BASIN AND COAST AREAS
(South to North and West).

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). No report.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Harney Branch Station, Burns (Obil Shattuck). No report.

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman Co. Branch Station, Moro (L. E. Stephens). No report.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). No report.

Plant Introduction Station, Chico (V. H. Florell). No report.

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BUREAU OF
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CEREAL COURIER

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION).

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Vol. 12. March 31, 1920. No. 5.
Personnel (March 16-31) and Miscellaneous Issue.

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SPECIAL CONTENTS

Agricultural Appropriation for Fiscal Year 1921.
Amendments to Fiscal and Administrative Regulations.
Use of Government Bills of Lading.
Manuscript Submitted for Publication.
Wheat and Oat Yields at Manhattan, Kans., 1919.
Progress of Barberry Eradication Campaign.
Biologic Specialization of Black Stem Rust.

PERSONNEL ITEMS

Miss Ruth F. Allen, who has been assisting Professor Mackie at the California Agricultural Experiment Station in a study of the germination of the wild grasses used in investigations of rust hosts, has been given furlough without pay during the three months, April to June, inclusive. In this period she will continue investigation for the California station.

J. C. Brinsmade, jr., left Washington April 3 for Mandan, N. Dak., where he will spend the summer in studying flax varieties and hybrids on the Northern Great Plains Field Station.

E. B. Brown returned to Washington March 25 from a trip to Texas, Louisiana, Mississippi, and Arkansas, where he supervised the planting of experimental plats of corn.

Charles E. Chambliss returned on March 25 from his trip in connection with the public hearings on the proposed grades for milling rice.

Dr. R. O. Cromwell, formerly conducting cooperative investigations of septoria diseases of cereals at the Iowa Agricultural Experiment Station, has entered the employ of E. W. Wagner & Company, a Chicago commission firm, to take charge of their crop reporting bureau.

L. W. Durrell, who was formerly employed in the cooperative investigation of crown rust of oats at the Iowa Agricultural Experiment Station and more recently had undertaken a cooperative investigation of anthracnose of cereals, resigned effective March 31 to accept a position at the Fruit Experiment Station, Mountain Grove, Mo.

George R. Hoerner, who has been in charge of the investigation of stem rust in the Northwest district, with headquarters at Corvallis, Oreg., has resigned because the work is being discontinued on account of lack of funds. He is employed in some special work with college alumni and his address now is 681 E. 17th Street, Portland, Oregon.

Dr. A. G. Johnson left Washington April 2 for his permanent station in Madison, Wis., after spending several weeks in Washington compiling data gathered in the cereal disease survey conducted jointly by the Offices of Cereal Investigations and Plant-Disease Survey.

C. O. Johnston, who has been assisting Professor Melchers in investigation of stem rust at Manhattan, Kans., has been granted leave of absence without pay for the 3 months, April to June, 1920, during which time he will continue investigations for the Kansas experiment station.

Robert S. Kirby, who has been in charge of the rust epidemiology and overwintering studies in the South Central district at the University of Oklahoma, Norman, is leaving because the shortage of funds is causing a reduction of the work, and will be at the Department of Plant Pathology of Cornell University on and after April 1.

L. J. Krakover, who has been in charge of epidemiology studies of stem rust in the Northeast district, with headquarters at Cornell University, has been given leave of absence without pay, effective April 1. After that date his address will be 2901 Center Avenue, Pittsburgh, Pa.

Carl Kurtzweil, who has been conducting investigations of rusts and fusarium rots in cooperation with the Tennessee Agricultural Experiment Station, has been given a furlough without pay from April 1 to June 30, inclusive. During that period he will continue investigation for the Tennessee station.

C. H. Kyle left Washington March 12 for points in Florida, Georgia, and South Carolina, to supervise the planting of experimental corn plats and the early cultivation of the crop.

Dr. C. E. Leighty left Washington on April 1 for Chicago to attend a hearing with reference to a revision of the existing Federal grades for wheat. This hearing was called by the Secretary of Agriculture following a visit of the a delegation from Minnesota and North Dakota on March 19, at which recommendations for changes in the wheat grades were presented by the State boards of

grain appeals at Minneapolis and Duluth and certain Minnesota and North Dakota State officials.

Louis Y. Leonard, who has been engaged in a study of stripe rust under Professor Mackie at Berkeley, Calif., has been granted leave without pay for the months of April, May and June, during which time he will be in the employ of the California Agricultural Experiment Station.

Moses N. Levine, who has been assisting Doctor Stakman in greenhouse studies of rust epidemiology at University Farm, St. Paul, has been given furlough without pay from April 1 to June 30, within which period he will be employed by the Minnesota Agricultural Experiment Station.

Miss Alpha E. Myers, who has been on furlough since January 1, has been granted three months additional furlough from April 1 to June 30.

F. D. Richey returned to Washington March 22 from a two-weeks trip to Louisiana, Arkansas, and Missouri, where he supervised the planting of experimental plats of corn.

Miss Jessie P. Rose, who has been assisting in stripe rust investigations under Professor Owens at Corvallis, Oreg., has been granted 3 months' leave of absence, effective April 1, during which time she will continue investigation for the Oregon Agricultural Experiment Station.

Raymond C. Rose, who has been in charge of the studies in stem rust epidemiology in the North Central East district, with headquarters at the Michigan Agricultural College, Lansing, Mich., resigned on March 25 to accept a position in Fort Smith, Ark.

Theodore Stoa, scientific assistant in charge of flax rotation experiments in North Dakota, resigned March 31, because of the discontinuance of the cooperative experiments made necessary by the curtailment of office funds. It is probable that Mr. Stoa will continue the experiments independently for the North Dakota station.

Albert F. Thiel, who has been in charge of rust epidemiology studies in the north-central west district, with headquarters at University Farm, St. Paul, has resigned, effective March 31, to accept the position of Associate plant pathologist at the Alabama Agricultural Experiment Station, Auburn, Ala.

H. W. Thurston, jr., who has been in charge of rust overwintering studies in the Southwest district, with headquarters at Tucson, Ariz., has resigned effective March 20 to accept a position in the Department of Botany of the Pennsylvania State College.

VISITORS

Professor C. A. Mooers, vice director and agronomist of the Tennessee Agricultural Experiment Station, was an office visitor on March 22. Professor Mooers was in Washington to attend a meeting of the advisory board representing the American Society of Agronomy on the National Research Council. This

meeting was also attended by Director J. G. Lipman of the New Jersey station and Prof. L. E. Call, agronomist of the Kansas station.

AGRICULTURAL APPROPRIATION BILL FOR THE FISCAL YEAR 1921.

The Agricultural Appropriation Bill for the fiscal year ending June 30, 1921, passed the Senate March 26, and is now in conference. As passed by the Senate it carries $32,740,671. This is a decrease of $1,159,000 as compared with the current fiscal year, and a decrease of $4,932,096 from the estimates submitted by the Secretary of Agriculture. It is an increase, however, of $2,468,007 over the bill as passed by the House, and of $434,460 over the bill as recommended by the Senate Committee on Agriculture and Forestry. The principal decreases in the bill as compared with the current fiscal year are [illegible] in the items for the Bureaus of Plant Industry, Soils, Entomology, Crop Estimates, Public Roads, and Markets. Other large decreases are in the appropriation for the eradication of the foot and mouth and other contagious diseases of animals, which was cut from $1,000,000 in the current act to $50,000; the item of $600,000 for the acquisition of lands for forest reserves in the Appalachian region, which is entirely eliminated; and the item of $100,000 for agricultural exhibits, also eliminated.

Increases over the appropriation act for the fiscal year 1920 were voted for the Office of Farm Management, the Weather Bureau, and the Division of Publications. There was little change in the items for other bureaus and offices. Among the special appropriations not included in the current act is $310,000 for fighting and preventing forest fires. A total of $500,000 is appropriated for the prevention of the spread of the European corn borer, as compared with $250,000 now available. The bill as passed by the Senate eliminates practically all the lower salaried clerical positions which it has been almost impossible to fill during recent years, and substitutes therefor a smaller number of positions at higher salaries, the total appropriation remaining unchanged.

The appropriation for the Bureau of Plant Industry is $2,842,378, as compared with $3,379,638 for the fiscal year 1920, and $3,606,898 in the estimates submitted by the Secretary. The Senate eliminated the item of $239,416 for seed distribution contained in the House bill, but increased several of the office appropriations. The bill as passed by the Senate carries increases over the current year of about $37,000 in statutory salaries, this increase being due to transfers from lump fund appropriations and consequent reduction of the latter. Most of the appropriations for the offices within the Bureau of Plant Industry were continued without change, or were slightly increased. Material reductions in appropriations were made in the items for the Control of Citrus Canker, Drug-Plant Investigations, Cereal Investigations, and Forage-Crop Investigations. While there is an apparent decrease of $40,000 in the item for Foreign Seed and Plant Introduction, there is actually an increase of $10,000 over this year's appropriation for the

regular work of the office, as the current act contains an item of $50,000 for the purchase of a farm at Bell, Md.

The item for Cereal Investigations carries $359,705, of which $50,000 is for investigations of black, leaf, and stripe rusts, and $147,200 for the location and destruction of barberry bushes. This total is $92,800 less than the current allotment and $165,920 less than the estimates. The item for barberry eradication is approximately the same as now, the reduction of $2,800 being covered by transfers to statutory salaries. The item for rust investigations is reduced $41,200, the balance of $8,800 being covered by transfers to statutory salaries. With the exception of the provisos for rust investigations and barberry eradication, the appropriation is a lump sum amounting to $162,505. This is a decrease of $40,000 from the current appropriation, of which $1,200 is transfer to statutory salary and $38,800 is actual reduction. The lump sum of $162,505 covers office administration, cereal production and improvement, and the cereal disease investigations which were included in the regular appropriation, together with corn improvement and investigations of corn root and stalk diseases, which were covered by special provisos. The emergency appropriation of $50,000 for the control of flag smut, take-all, and other destructive soil and seed-infecting diseases of wheat and other cereals, known as the cereal disease control appropriation, is continued without change.

Information will be given later regarding the action of the conferees and final passage of the bill, particularly as to changes made in conference.

AMENDMENTS TO THE FISCAL REGULATIONS.

The following amendments to Fiscal Regulations are contained in Memorandum No. 306 of the Secretary of Agriculture, dated February 14, 1920.

"Paragraph No. 22 and sections (e) and (h) of Paragraph No. 86, of the Fiscal Regulations, are hereby amended to read as follows:

22. ABSENCE WITHOUT PAY.- An employee not in a duty or pay status during an entire calendar month will suffer a loss of one day's pay for each day in which he is in a non-pay status, except that:

(a) Absence without pay on both the thirtieth and thirty-first day of a 31-day month will be counted as one day's absence without pay.

(b) Absence without pay on the last day of a 28-day month will be counted as three days' absence without pay.

(c) Absence without pay on the last day of a 29-day month will be counted as two days' absence without pay.

86. ACTUAL TRAVELING EXPENSES DEFINED.-

(e) Street-car, transfer-coach, omnibus, cab, carriage, or taxicab fares will be allowed for each personal transfer if the charge is not in excess of locally prevailing rates: Provided, That charges for taxicabs or other means of transportation more expensive than street cars will be allowed only

when it is shown that street-car service was not available or that the use of taxicabs or other means of transportation more expensive than street cars was a public necessity rather than a personal convenience. The statement that street-car service "was not available" should be made only as to cities where there are no street cars. Inclement weather, unfamiliarity with a city, or the fact that heavy hand baggage is being carried will not justify the use of taxicabs or other means of transportation more expensive than street cars, nor will charges for such transportation be allowed if street cars are within walking distance of the depot, hotel, or other place the employee is required to visit on official business. Tips to drivers or chauffeurs will not be allowed. Transfers of baggage containing Government property or private property for Government use will be allowed at locally prevailing rates, and the transfer of one piece of personal baggage at such rates will also be allowed when the personal baggage consists of a trunk or like article too heavy to carry. (For rates in the District of Columbia, see Appendix G.) Every charge for baggage transfers included in reimbursement accounts must indicate the number of pieces transferred and be supported by a statement that the baggage transferred was Government property, private property for Government use, or personal baggage consisting of a trunk or like article too heavy to carry. An employee may properly choose his residence in a suburb of his official station, and personal transfers and transfers of baggage as herein provided will be allowed between such residence and the depot at his official station at the beginning and termination of official travel. Payments in excess of 50 cents for personal transfers and transfers of baggage must be explained in writing. Personal transfers and transfers of baggage between hotels will be allowed only when satisfactorily explained. When properly explained, storage charges, to avoid frequent transfers, may be allowed on baggage containing Government property, private property for Government use, or personal baggage consisting of a trunk or like article too heavy to carry.

(h) Except as provided in paragraphs 86 (v), customary charges for subsistence expenses, not to exceed in the aggregate $5 for any one day, may be allowed, and will include all expenses incurred for meals, lodging, bath, personal use of room at hotel during the day time, waiter fees not exceeding 30 cents in any one day; fees for checking and porterage of baggage upon arrival at and departure from hotels not to exceed 10 cents for porterage of, and 10 cents for checking, each piece; laundry to be included in subsistence expenses for the date on which paid; telegrams to hotels reserving accommodations (but not telegrams reserving stateroom accommodations which are not items of subsistence but travel expenses, and may be reimbursed in addition as such when the necessity for the expense is satisfactorily explained); and all other subsistence expenses. Charges for

laundry at an average rate not exceeding 20 cents a day for each day while in travel status. Charges incurred for laundry at official headquarters at the termination of a trip will not be allowed. Receipts for laundry must be submitted or a written statement filed with the account showing the impracticability of obtaining such receipts. A charge for lodging at a hotel and a charge for sleeping berth for the same night will be allowed only when accompanied by a definite statement of necessity: Provided, That reimbursement for the payment of any fee herein mentioned will not be allowed in States in which the payment of such fee is prohibited by law. (See Appendix F.)"

AMENDMENTS TO THE ADMINISTRATIVE REGULATIONS.

Memorandum No. 307 of the Secretary's Office contains the following amendments to the Administrative Regulations:

"Paragraphs 96 and 111 of the Administrative Regulations of the Department of Agriculture are hereby amended to read as follows:

96. LEAVE WHICH MAY BE ALLOWED ON SEPARATION FROM THE SERVICE:- On separation from the department by resignation, transfer, or any other termination of appointment without prejudice, employees may, in meritorious cases, be granted accrued leave at the rate of $2\frac{1}{2}$ days for each month of service since the first of the calendar year for employees in the District of Columbia and $1\frac{1}{4}$ days for employees outside of the District of Columbia, except in such field offices as enjoy equal privileges under the law with employees in the District of Columbia.

Whether employees dismissed from the service for cause shall be allowed accrued leave is a matter to be determined by the Secretary, upon the recommendation of the chief of bureau concerned, according to the circumstances in each case. An employee dismissed from the service for cause may be required, in the discretion of the Secretary, to make refund from his salary for leave already taken in excess of accrued leave.

111. MILITARY LEAVE:- All employees of the United States and of the district of Columbia who shall be members of the National Guard shall be entitled to leave of absence from their respective duties without loss of pay, time, or efficiency rating, on all days during which they shall be engaged in field or coast defense training ordered or authorized under the provisions of section 80 of the national-defense act. Such employees are, however, not entitled to leave with pay while they are on active military duty under order of the governor of a State, in connection with the suppression of strikes and riots.

Under the provisions of section 92 of the act, it is prescribed that "each company, troop, battery, and detachment in the National Guard shall * * * participate in encampments, in maneuvers, or other exercises, including outdoor target practice at least fifteen days in training each year." The provisions of section 80 apply to the fifteen days' period prescribed in section 92 of the act.

The act of August 29, 1916 (39 Stat., 556, 594), provides that whenever a member of the Naval Militia who is an officer or employee of the United States attends drills, cruises, or other ordered duty of the Naval Militia, he shall receive the amount of the salary or wages he would have earned had he not been so ordered, in addition to the amount provided for by law as a member of the said Naval Militia. Members of the Fleet Naval Reserve ordered out in connection with maneuvers are not entitled to leave without charge but may to cover such absence from this Department be (1) granted annual leave with pay within legal limitations, i.e., 30 days in Washington and 15 days in the field, or (2) granted leave with pay.

The Army appropriation act of May 12, 1917 (40 Stat., 40, 72), provides that all employees of the United States or of the District of Columbia who shall be members of the Officers' Reserve Corps shall be entitled to leave of absence from their respective duties, without loss of pay or time, on all days during which they shall be ordered to duty with troops or at field exercises, or for instruction, for periods not to exceed fifteen days in any one calendar year."

USE OF GOVERNMENT BILLS OF LADING.

F. E. Meloy, Officer in Charge of Property in the Bureau of Plant Industry in a memorandum to heads of offices dated March 29, 1920, makes the following suggestions regarding Government bills of lading:

"For some time past it has been noticed that shipments coming into the Bureau on Government bills of lading from field stations are addressed to an individual rather than to the Department of Agriculture, Bureau of Plant Industry, for delivery to the individual, and recently this manner of addressing incoming shipments has been on the increase.

"Almost invariably these shipments are taken by railroad companies to be private shipments and notices of arrival are sent to the individual rather than to the Department and this office has no information in regard to the arrival until after storage charges have accumulated.

"It is requested that shipments sent in on Government bills of lading be addressed as follows:

'Department of Agriculture, Bureau of Plant Industry, John Smith, Washington, D. C.'

"If this procedure is followed the railroad companies will have no grounds for withholding the shipment and will turn it over to the drayage company for immediate delivery to this Bureau."

PUBLICATIONS OF THE OFFICE OF CEREAL INVESTIGATIONS.

Following are the titles of bulletins and papers published by members of the staff of the Office of Cereal Investigations since July 1, 1919, those submitted for publication since that date, and those which are now practically ready for submission. In each case the medium of publication is indicated, whether in one of the Departmental series, in a bulletin series of a cooperating State agricultural experiment station, or in scientific journals.

A. AGRONOMIC SUBJECTS.

Corn.

Pop corn for the Home, Farmers' Bulletin 553, by C. P. Hartley and J. G. Willier, copy for revised edition, submitted March 15, 1920.

Pop corn for the Market, Farmers' Bulletin 553, by C. P. Hartley and J. G. Willier, copy for revised edition submitted Feb. 5, 1920; galley proof read March 24, 1920.

Corn Culture in the Southeastern States, Farmers' Bulletin 729, by C. H. Kyle, copy for revised edition submitted March 11, 1920.

Formaldehyde Treatment of Seed Corn, by Frederick D. Richey, in Jour. Amer. Soc. Agron., vol. 12, no. 1, pp. 39-43, January 1920.

The Inequality of Reciprocal Corn Crosses, by Frederick D. Richey, approved April 5, 1920, for publication in the Journal of the American Society of Agronomy.

Wheat.

Australian Wheat Varieties in the Pacific Coast Area, by J. Allen Clark, David E. Stephens, and Victor H. Florell, submitted March 9, 1920, for publication as a Department bulletin.

Varietal Experiments With Spring Wheat In the Northern Great Plains, by J. Allen Clark, John H. Martin, and Ralph W. Smith, submitted March 31, 1920, for publication as a Department Bulletin.

Natural Wheat-Rye Hybrids of 1918, by Clyde E. Leighty, submitted Feb. 5, 1920, to Journal of Heredity.

Oats

Experiments with Kherson and Sixty-Day Oats, Department Bulletin 823, by C. W. Warburton and T. R. Stanton, page proof read February 13, 1920.

Fall-Sown Oats, by C. W. Warburton and T. R. Stanton, submitted December 23, 1919 for publication as a Farmers' Bulletin. This is to replace Farmers' Bulletin 436, Winter Oats for the South, by C. W. Warburton.

Barley.

The Germination of Barley Pollen, by Stephen B. Anthony and Harry V. Harlan, submitted July 8, 1919; published in Jour. Agr. Research, vol. 18, no. 10, pp. 525-536, Feb. 16, 1920.

The Occurrence of the Fixed Intermediate Hordeum intermedium haxtoni in Crosses between H. vulgare pallidum and H. distichon palmella, by Harry V. Harlan and H. K. Hayes, submitted November 15, 1919, for publication in Journal of Agricultural Research.

The Rate of Development of Kernels of Hannchen Barley from Flowering to Maturity at Aberdeen, Idaho, by Harry V. Harlan, submitted December 3, 1919, for publication in Journal of Agricultural Research.

The Development of Barley Kernels in Normal and in Clipped Spikes and the Limitations of Awnless and Hooded Varieties, by Harry V. Harlan, submitted Feb. 19, 1920, for publication in Journal of Agricultural Research.

The Inheritance of the Length of Internode in the Rachis of the Barley Spike, by H. K. Hayes, and Harry V. Harlan, submitted March 29, 1920, for publication as a Department Bulletin.

Smooth-awned Barleys, by Harry V. Harlan, approved for publication in the Journal of American Society of Agronomy.

Rice

Prairie Rice Culture in the United States, Farmers' Bulletin 1092, by Charles E. Chambliss, submitted August 7, 1919, page proof read February 7, 1920.

Rice Growing in California, by Charles E. Chambliss, submitted March 1920, for publication as a Farmers' Bulletin. This supersedes Farmers' Bulletin 688, The Culture of Rice in California, by Charles E. Chambliss and E. L. Adams.

Grain Sorghums and Broomcorn.

Broomcorn Experiments at Woodward, Okla., Department Bulletin 836, by B. E. Rothgeb and J. B. Sieglinger, submitted August 9, 1919; page proof read Feb. 17, 1920.

Milo, a Valuable Grain Crop, by Benton E. Rothgeb, submitted February 2 1920, for publication as a Farmers' Bulletin.

Grain Sorghums: How to Grow Them, by Benton E. Rothgeb, submitted April 1, 1920, for publication as a Farmers' Bulletin.

Temporary Roots of the Sorghums, by John B. Sieglinger, in Journal of the American Society of Agronomy, vol. 12, no. 4, pp. 143-145, April, 1920. In press.

MINOR CEREALS.

Buckwheat, Farmers' Bulletin 1062, by Clyde E. Leighty, issued October, 1919.

Proso Millet, by John H. Martin, ready for submission as a Farmers' Bulletin.

Flax

Experiments with Flax on Breaking, by Charles H. Clark, submitted February 2, 1920 for publication as a Department Bulletin.

General or Miscellaneous

Growing Irrigated Grain in Southern Idaho, Farmers' Bulletin 1103, by L. C. Aicher, submitted Sept. 3, 1919; galley proof read April 3, 1920.

Sixteen Years of Dry-Farm Experiments in Utah, by F. S. Harris, A. F. Bracken and I. J. Jensen, in manuscript for publication as a bulletin of the Utah Agricultural Experiment Station.

Federal Seed Grain Loans, by C. W. Warburton, in Jour. Amer. Soc. Agr. vol. 12, no. 2, pp. 45-55, February, 1920.

B. CEREAL DISEASE PUBLICATIONS.

General Cereal Disease.

Treatment of Cereal Seeds by Dry Heat, by I. Atanasoff and A. G. Johnson, published in Jour. Agr. Res., vol. 18, no. 7, pp. 379-390, Jan. 2, 1920.

Coats

Relation of Injury to Seed Coats of Wheat and Barley to Their Susceptibility to Molds and Fungicides, by Annie May Hurd, to be submitted for publication as a Department Bulletin.

Injury to Seed Wheat Resulting from Drying after Disinfection with Formaldehyde, by Annie May Hurd, to be submitted for publication as a Department Bulletin.

Imperfect and Sac Fungi.

The Production of Conidia in Gibberella saubinetii, by James G. Dickson and Helen Johann, submitted March 15, 1920 for publication in the Journal of Agricultural Research.

The Nematode Disease of Wheat Caused by Tylenchus tritici, Department Bulletin 842, by L. P. Byars, now in galley proof.

Take-all and Flag Smut, Two Wheat Diseases New to the United States, Farmers' Bulletin 1065, by Harry B. Humphrey and Aaron G. Johnson, August, 1919.

The Eel-worm Disease of Wheat and Its Control, by Luther P. Byars, Farmers' Bulletin 1044, revised edition issued February, 1920.

The Brown-spot Disease of Corn, with Suggestions for Its Control, Farmers Bulletin 1122, by W. H. Tisdale; submitted January 13, 1920; galley proof read March 13, 1920.

Wheat Scab or Fusarium Blight of Wheat and Other Cereals, by A. G. Johnson and J. G. Dickson. Manuscript for Farmers' Bulletin completed but not yet submitted.

Disease-free Sweet Corn Seed, by G. N. Hoffer, Purdue University Agr. Exp. Sta. Bul. 243, issued January, 1920.

A Modified Rag Doll and Germinator Box, by B. H. Duddleston, Purdue Univ. Agr. Exp. Sta. Bul. 236, issued February, 1920.

The Wheat Nematode, Tylenchus tritici, Attacking Rye, Oats, Spelt, and Emmer, by L. P. Byars, A. G. Johnson, and R. W. Leukel, in Phytopathology, vol. 9, no. 7, pp. 283-284, July, 1919.

A Seed-borne Sclerotium and Its Relation to a Rice Seedling Disease, by G. H. Godfrey, submitted March 26, 1920 to Phytopathology.

Rusts.

Rust in Seed Wheat and Its Relation to Seedling Infection, by C. W. Hungerford, submitted September 25, 1919 for publication in Journal of Agricultural Research; approved for publication.

Destroy the Common Barberry. Farmers' Bulletin 1058, by E. C. Stakman, revised edition issued August, 1919.

Stem Rust of Grains and the Barberry in Wisconsin, by A. G. Johnson and James G. Dickson, Wis. Agr. Exp. Sta. Bul. 304, issued August, 1919.

Cereal Rusts of Small Grains, by I. E. Melhus and L. W. [illegible], Iowa Agr. Exp. Sta. Circ. 62, issued November, 1919; [illegible], August, [illegible].

Biologic Forms of Puccinia coronata, by G. H. Hoerner, in Phytopathology, vol. 9, no. 8, pp. 309-314, August, 1919.

A Comparative Morphological Study of Aecia of Four Different Rusts Found Upon Barberry in North America, by H. R. Rosen and R. S. Kirby, in Phytopathology, vol. 9, no. 12, pp. 569-573, December, 1919.

A Preliminary Study of the Rust Resistance of Oats, by John H. Parker, in Jour. Amer. Soc. Agron., vol. 12, no. 1, pp. 23-38, January, 1920.

Three Winter Wheat Varieties Resistant to Leaf Rust in Kansas, by Leo. E Melchers and John H. Parker, in Phytopathology, vol. 10, no. 3, pp. 164-171, March, 1920.

Puccinia graminis on Native Berberis canadensis, by E. C. Stakman and L. J. Krakover, submitted to Phytopathology, March 1, 1920.

The Effect of Citrus Acid on the Germination of Teliospores of Puccinia graminis tritici, by A. F. Thiel and Freeman Weiss, to be submitted for publication in Phytopathology.

Downy Mildews

The Philippine Downy Mildew of Maize, by William H. Weston, submitted September 25, 1919 for publication in the Journal of Agricultural Research; galley proof read March 22, 1920.

SMUTS

Flag Smut, see Take-all and Flag Smut, under "Imperfect and Sac Fungi."

Seed Treatment for the Prevention of Cereal Smuts, by W. W. Mackie, Calif. Agr. Exp. Sta. Circ. 214, issued September, 1919.

YIELDS OF WHEAT AND OATS AT MANHATTAN, KANS.

Professor Salmon has furnished the following data on the yields of winter wheat, and spring oat varieties grown at the Agronomy Farm in 1919. The wheat yields are averages of three plats of each variety, while the oat yields are averages of two plats.

WINTER WHEAT

Kansas No.	Name.	C. I. No.	Class.	Yield per acre.
34	Nebraska Hybrid	5147	Soft	30.7
2084	Zimmerman	6211	Soft	26.2
343	Clark's Black Hull	6251	Soft(?)	25.7
2440	Zimmerman type	6218	Soft	23.5
382	Kharkof	6206	Hard	22.9
2123	Defiance Winter	6214	Hard	21.4
846	Crimean	6208	Hard	21.0
570	Turkey	1558	Hard	20.9
2401	Kanred	5146	Hard	20.7
2415	(P 1066)	5879	Hard	20.6
1443	Kharkof	6209	Hard	20.2
373	Defiance Winter	6205	Hard	20.1
223	Illini Chief	6200	Soft	19.6
1664	Turkey Type	6472	Hard	18.2
2382	Improved Turkey	5592	Hard	18.1
2156	Fultz	6215	Soft	17.9
19	Harvest Queen	6199	Soft	17.8
2409	Turkey	6217	Hard	17.7
2048	Alberta Red	5797	Hard	17.4
321	Nebr. No. 6	6249	Hard	17.4
2414	(P. 1068)	5880	Hard	17.3
2101	Red Winter	6213	Hard	16.9
2411	Peloglina	1543	Hard	16.5
2412	Romanella	2479	Hard	16.5
304	Tauranian	6202	Hard	14.8
284	Malakoff	6470	Hard	14.5 *
206	Buffum No. 17.	3330	(Soft?)	11.9 *
35	Kharkof	1442	Hard	10.3 *
2413	Turkey type	6474	Hard	10.8 *
2039	Turkey	6473	Hard	9.7 *

* Two plats only.

The two highest yielding varieties are soft wheats, and the third resembles the soft wheat group in plant characters, appearance of grain, and in milling and baking tests. These results are no doubt due to the unusually wet season, which was less favorable for hard wheat. The old standard v r.

eties, Kharkov 382 and Turkey 570, both outyielded Kanred 2401. This has been true in only one other year (1914) of the 9-year test, 1911-1919.

OATS

Kansas No.	Name	C. I. No.	Class.	Yield per acre
5179	Fulghum		Red	54.3
5208	Albion (Iowa 103)	729	White	53.4
5209	Richland (Iowa 105)	787	White	48.8
6021	Kherson	-	White	47.9
5209	Do.	-	White	47.8
5234	Do.	-	White	47.0
5204	Do.	-	White	45.3
5211	Burt	-		42.3
6084	Texas Red	-	Red	37.3
5020	Burt	293	-	37.2
6206	Aurora	831	White	37.1
6052	Burt	293	-	35.2 *
5085	Texas Red	-	Red	33.2
5205	Do.	-	Red	31.5
5015	Do.	-	Red	29.4
6086	Do.	-	Red	26.4
5105	Red Algerian	-	Red	23.7

* One plat only.

Fulghum (Kansas 5179) heads the list, even in a season favorable for varieties of the white oat group. This variety outyielded the highest yielding Red Texas (Kansas 6084) in this series by 17 bushels. Albion and Richland, Iowa Nos. 103 and 105, selections from Kherson, follow Fulghum very closely and are clearly superior to other varieties of the Sixty-Day or Kherson type. Burt and Aurora did not make as good yields, but are nevertheless of decided interest.

PROGRESS OF BARBERRY ERADICATION CAMPAIGN.

Reports to the Office of Cereal Investigations indicate that from the beginning of the campaign to December 31, 1919, approximately 3,345,587 barberry bushes have been located and 3,120,321 have been removed. The data by States are as follows:

State	Number Located.	Number Removed.
Colorado	19,640	17,706
Illinois	81,000	75,000
Indiana	83,613	79,361
Iowa	196,419	145,154
Michigan	246,115	212,671
Minnesota	715,441	710,541
Montana	9,039	8,916
Nebraska	75,922	69,253
North Dakota	17,000	17,000
Ohio	188,867	107,327
South Dakota	27,283	17,287
Wisconsin	1,681,475	1,659,779
Wyoming	3,764	326

These figures do not, in all cases, include thousands of bushes removed from nurseries through the efforts of the State inspectors of nurseries or other thousands of bushes, of which we have no record, voluntarily removed by property owners.

Between July 1 and December 31, 1919, 1,671,774 wild barberries were located upon 1,071 farm properties. Other areas also have been located within the past year in 118 counties in 11 of the States. When careful surveys are made, these doubtless will show over a million more wild bushes.

218-B. INVESTIGATIONS OF RUSTS.

(Dr. H. D. Humphrey, Pathologist in Charge.)

BLACK STEM RUST SUBPROJECT.

(Dr. H. B. Humphrey, Pathologist, Leader.)

BIOLOGIC SPECIALIZATION (E. C. Stakman).

The following progress report on studies of biologic specialization of black stem rust has been received from Dr. E. C. Stakman, University Farm, St. Paul, Minn.:

The Determination of New Forms.

Thirteen strains of P. graminis tritici have been identified during March. These were classified into seven biologic forms. No new collections were received during the month. Extensive inoculations on grasses with the biologic forms of Puccinia graminis tritici have been begun. Preliminary observations seem to indicate that most of the forms will probably act quite similarly on grasses.

Nature of Resistance.

Infection of barberries was obtained in the greenhouse early in March. Some of the material may be used to study the sequence of events in highly resistant forms.

A heavy epidemic of stem rust has been obtained on nearly mature plants as a result of steaming the house thoroughly and spraying with a spore suspension. Some hand inoculations also were made. The infection is so severe that there will be excellent opportunity for studying the effects of the rust on plants in the fertilizer experiments.

Origin and Nature of Biologic Forms

No new results of general interest have been obtained. It is, however, important to note that the rust forms from single spore isolation are behaving normally.

Northeastern District

Germination tests of urediniospores were made at Ithaca on March 20. As these constitute the last test Mr. Knakover tried them on an extensive scale. A bare trace of urediniospores of P. graminis tritici germinated. A very few spores also germinated from material collected on fall-sown wheat. All of the urediniospores, however, germinated only weakly. Tests of Puccinia

graminis secalis and Puccinia graminis avenae also were made but none of the spores germinated. Approximately 6 per cent of the spores of Puccinia graminis phleipratensis still germinated. On the other hand, the urediniospores of the leaf rusts germinated practically as well in February.

Mr. Krakover is of the opinion that the evidence for the overwintering of urediniospores in New York is rather weak. As a matter of fact, such a small number of urediniospores germinated in March, it seems quite unlikely that urediniospores overwinter to any extent. It must be admitted, however, that there is some possibility that new infections might be caused by the spores which still remained viable March 20. However, the most critical period comes after March 20. After all of the snow has disappeared and the spring rains occur, the spores are much more likely to lose their germinating power than they are when protected by snow. It is quite evident that the stem rust and the leaf rusts differ markedly in the winter hardiness of their urediniospores.

North-Central-East District.

Germination tests of urediniospores were made at East Lansing, Mich., on March 19. About 6 per cent of the urediniospores still germinated. Teliospores had not yet begun to germinate. Here again, however, attention is called to the fact that the next month will tell the story of uredinial overwintering. It would be entirely unsafe to conclude that the spores which are still viable should cause infection on grains and grasses.

North-Central-West District.

Snow began to disappear about March 15 and by March 20 it was entirely gone from all of the overwintering stations at St. Paul. In protected places a small amount of snow remained, however. The urediniospores of the various strains of P. graminis had been protected continuously with snow from the first week in November until March 18. During all of this time about 3 per cent of the urediniospores remained viable. As soon as the snow disappeared, however, it became increasingly difficult to find viable urediniospores. Heavy rain and strong winds probably separated the spores from the plants. It is quite likely also that many of the urediniospores which still remain viable may have germinated during the rains. However, about 1½ per cent of the urediniospores of Puccinia graminis tritici on winter wheat still remained viable March 25. About 3 per cent of the spores of Puccinia graminis phleipratensis germinated. The leaf rusts urediniospores are still germinating fairly well. The urediniospores on winter wheat at Laramie, Wyo., are still germinating. No viable urediniospores of P. graminis avenae and P. graminis secalis could be found at St. Paul. Further tests will be made. Arrangements have been made whereby the work can be continued until the beginning of the new growing season in Minnesota.

South-Central District.

Urediniospores of Puccinia graminis tritici are germinating normally at State College, N. Mex., and Boerne, Texas. Unquestionably the rust has overwintered in the uredinial stage at these stations. Mr. Butler found a new uredinium of P. graminis tritici on a green wheat leaf indicating that new infection already has occurred. At State College, N. Mex., the stem rust is spreading rapidly in the wheat plats. At Norman, Okla., and Columbia, Mo., however, not so many urediniospores are viable, but it seems likely that enough of the spores of P. graminis will remain viable to cause reinfection on fall-sown wheat. Urediniospores of leaf rusts are germinating normally.

Southwestern District.

No new results reported.

Northwestern District.

Work was discontinued early in March and results obtained were not strikingly different from those of February.

General Observations.

Although it has been necessary to discontinue the epidemiology studies, it will be possible to make some observations in the Northern States which will probably show clearly the relative importance of overwintering urediniospores and of barberry infection. It has been shown conclusively that the urediniospores do overwinter in the south. It is still problematical whether the urediniospores which remain in the north will retain their viability long enough to infect fall-sown grains and grasses. It seems quite unlikely that any of the spores will remain viable long enough in the spring wheat region to infect spring-sown grains.

A careful study of teliospore germination has been made by Mr. Thiel and Mr. Weiss. It has been shown that citric acid stimulates germination. A paper embodying these results has been submitted for publication.

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CEREAL COURIER

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Personnel (April 1-10) and Field Station (March 16-31) Issue.

PERSONNEL ITEMS

Olaf S. Aamodt, who before entering military service had charge of the wheat nursery in the cooperative rust resistance breeding investigations at the Minnesota Agricultural Experiment Station, was discharged from the army recently and has been reinstated effective April 1, to assist in cooperative investigations with rust resistance and winter resistance of wheat, with headquarters at University Farm, St. Paul.

Mrs. Lucille K. Bartholomew, who has been in charge of the cooperative investigation of the relation of temperature to the development of smut fungi at the Wisconsin Agricultural Experiment Station, resigned effective February 29 to accompany her husband, Prof. E. T. Bartholomew, to his new position at the Citrus Experiment Station, Riverside, Cal.

H. Howard Biggar has resigned, effective April 30, from the cooperative investigation of fusarium rots of corn at Bloomington, Ill., to accept the position of associate editor on the Northwest Farmstead and Dakota Farmer, Minneapolis, Minn., at a large increase in salary.

Manley J. Champlin, for many years associate agronomist of the South Dakota college and station and collaborator of this Office in cooperative cereal experiments at Brookings, Highmore, and other points in the State, has resigned effective March 31 to accept the position of agronomist in the Extension Division of the South Dakota College of Agriculture. He will remain a collaborator of this Office at a nominal salary.

An article entitled "Marquis Wheat," by J. Allen Clark, was published in the Country Gentleman of April 10.

Page proof of the revised edition of Farmers' Bulletin 554, "Popcorn For the Market," by C. P. Hartley and J. G. Willier, was read April 6.

Dr. H. B. Humphrey, addressed the weekly conference of extension specialists in the States Relations Service April 6 on special equipment of thrashing machines in relation to smut control. At this meeting of the conference the cooperative experiments for the control of explosions and fires in thrashing machines caused by smut and grain dust in the Pacific Northwest were discussed by representatives of the cooperating bureaus, the Bureau of Markets, the Bureau of Chemistry, and the Bureau of Plant Industry.

Yandle A. Jackson, who was appointed February 11 to assist in conducting plat experiments with cereals at the Tennessee Agricultural Experiment Station resigned effective February 29 to enter other work.

Chris Koch, who has been a laborer on the Adams County Branch Station at Lind, Wash., has resigned effective March 31.

Dr. C. E. Leighty returned April 6 from Chicago, where he attended the hearing on the Federal grades for wheat. This hearing was called by the Secretary of Agriculture at the request of Minnesota and North Dakota State Officials and farmers. It was attended by about 200 millers, grain dealers, brokers, farmers, Federal and State officials, and other interested persons. The general sentiment, particularly among millers and grain dealers, was that the grades should have a fair trial in an unrestricted market before further changes were made in them. It has been difficult to determine the value of the present grades because of the fact that they have been operative only during the period of price control under war legislation.

Harold H. McKinney, in charge of investigation of take-all, with headquarters at the University of Wisconsin, went to Granite City and other points in Illinois in the latter part of March to begin a spring study of the development of this disease in the experimental areas and on infested farms in that State.

L. S. Mayer left Washington April 2 for Rhinebeck, N. Y., and other points in New York and New England to supervise experimental plantings of corn and to take notes on varietal and breeding experiments. He will remain in the field several months.

Stephen M. Spangler, who was formerly in the cooperative cereal experiments at the Tennessee Agricultural Experiment Station and resigned therefrom about a year ago on account of ill health, has been reappointed effective March 16 to fill the vacancy caused by the resignation of Y. A. Jackson.

Theodore Stea, whose resignation as scientific assistant was recorded in the Cereal Courier of March 31, has been elected assistant agronomist of the North Dakota station.

Gus Teibe, a student at the Idaho College of Agriculture and who has had summer employment during recent years at the Aberdeen Substation, has been given a temporary appointment effective April 12, to assist Mr. Aicher with the seeding of the extensive barley and oat nurseries at Aberdeen.

VISITORS

John R. Humphrey, of the University of Kentucky, formerly connected with the Bureau of Markets, was an office visitor April 6 and 7.

A. L. Marley, who assisted Mr. Pope in physiological studies of the growth of the barley plant at the Aberdeen substation last summer, was an office visitor April 5 and 6. Mr. Markley is now pursuing post-graduate study in chemistry at Cornell University.

H. Work, formerly of the Forest Service, but now a chemical engineer investigating the use of crop residues in paper manufacture for the Industrial Chemical Company of New York, was an office visitor April 9. He was seeking information regarding sections where straw or other similar material is available in large quantities, and also regarding the proportion of straw to grain in cereal crops.

CONDITION OF FALL-SOWN WHEAT AND RYE.

The average condition of fall-sown wheat on April 1, as reported by the Crop Reporting Board of the Bureau of Crop Estimates on April 8, was 75.6 per cent of a normal against 99.8 per cent a year ago, 78.6 per cent on April 1, 1918, and 84.1 per cent, the average condition for the past 10 years. The condition on April 1 showed a decline of 9.6 points from the condition on December 1, 1919, as compared with an average decline of the past 10 years of 5.4 points during a similar period.

On the assumption of average abandonment of acreage and average influences on the crop from April 1 to harvest, the condition reported indicates a production of about 483,617,000 bushels as compared with 731,636,000 bushels produced in 1919, and 565,099,000 bushels in 1918. The condition is particularly low this year in Ohio, Indiana, Illinois, Kentucky, Tennessee, and Missouri, in all of which States conditions a year ago were extremely favorable. The lowest condition of all is reported in Indiana, 59 per cent of a normal, the condition in the other States named ranging from 62 per cent in Kentucky to 70 per cent in Missouri. The condition of the Kansas crop is reported as 73 per cent, as compared with 101 per cent a year ago, and a 16-year average of 79 per cent. In general, the poor condition of the crop is due to unfavorable weather, although Hessian fly damage has been a large factor in Indiana and adjoining States.

The average condition of rye on April 1 was 86.8 per cent of a normal, as compared with 90.6 per cent a year ago, 85.8 per cent on April 1, 1918, and 89 per cent, the average condition for the past 10 years on April 1. The condition of the rye crop indicates a production of approximately 75,841,000 bushels, as compared with an estimated production last year of 88,478,000 bushels, of 91,041,000 bushels in 1918, and an average of 50,001,000 bushels in the preceding five years. The condition of the rye crop in North Dakota, the leading rye State, is estimated at 81 per cent of a normal as compared with 80 per cent a year ago and a 10-year average of 85 per cent.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North).

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). Professor Essary returned from the University of Wisconsin March 23. He reports very little winterkilling in the wheat plots at the Jackson station. The oats, however, were almost entirely killed.

Wheat at the Knoxville station is in excellent condition, with very few varieties injured. Oats, with the exception of a few varieties, are badly injured, and many varieties entirely killed.

A bacterium isolated from corn grain has been found to be pathogenic on corn seedlings.

NORTH CAROLINA

State Experiment Station, West Raleigh, and Substations (G. M. Garren). No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). The rainfall during March has been considerably below the normal for the month and the land is now in good shape for plowing. A few nursery rows of oats will be seeded. Winter wheat, rye and barley came through the winter in excellent condition, and at present appear promising. Only one plat of barley, Hansee Hullless, C. I. No. 803, shows any serious evidence of winter injury. Emmer, C.I. No. 3628, was badly winterkilled, while Black Winter emmer, C.I. No. 2337, came through in good shape.

In the rate-and-date-of-seeding and method-of-soil-preparation experiments plats of winter wheat seeded on September 16, October 6, and October 30 all show excellent stands. The disked plats appear better than the plowed ones.

Considerable winterkilling has occurred in the winter oat plats. This is especially noticeable in Fulghum, C.I. No. 708, and Aurora, C.I. No. 831.

Minimum temperature for the month, 16°; maximum temperature, 73°; rainfall, 2.44 inches.

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love). (April 5). For the past two weeks the weather has been warm and fall-sown grains are

making a good start. Rain has been needed and is now falling. This will help the wheat and rye as well as meadows and pastures. As soon as the present storm has passed and the ground is dry, the seeding of the spring grains will be begun.

The series of hybrids will be sown first. This series includes a large number of new crosses which have been made for both practical and theoretical studies. A number of sowings will also be made for the study of inheritance of hardiness or quality in wheat. It is planned to increase improved varieties of oats and barley more rapidly by seeding larger acreages on the College farm and also by furnishing certain strains to the members of the Jefferson County Oat Growers' Association. The demand for improved strains is now so great that it is necessary for us to multiply this seed as rapidly as possible. All of the seed available of our improved strains has been bought and sown this year.

The varieties of wheat that were sown in the greenhouse for the purpose of making new hybrids are now blooming and numerous crosses are being made.

INDIANA

Indiana Agricultural Experiment Station, Lafayette (George M. Hoffer). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). H. H. McKinney is spending some time in Granite City, Ill., supervising the sowing of the take-all plats and collecting specimens from the fields which were infected with the so-called take-all last year.

Miss Grace O. Vineland has returned from a two-weeks visit at Bryan,, Ohio, and LaFayette, Ind.

Mrs. L. K. Bartholomew, who has been employed in this office for the past year and a half, has gone to Riverside, Cal., where Dr. Bartholomew has accepted a position at the Citrus Experiment Station. Miss Edith Seymour is continuing the oat smut experiments at Madison.

The Madison grain drying oven has been used during the winter and spring in the dry-heat treatment of about 20 bushels of grain for the prevention of scab, smuts, Helminthosporium blights, and bacterial blights. The grain is being sown at various points in Illinois, Oklahoma, South Dakota, Tennessee, Indiana, Virginia, and Wisconsin.

The first field sowings of cereals were made at Madison March 30 and 31.

Captain Birks of Sydney, Australia, enroute home after several years of service in the world war, spent two days here recently, looking over the various laboratory and greenhouse experiments.

Miss Anna E. Rathbun, who is being transferred from the Office of Forest Pathology at Washington, D. C., to Mr. Wier's laboratory at Spokane, Wash., visited at Madison enroute.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). No report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). (March 20). Frost is practically all out of the ground today and a few days of drying wind will let us into the fields. About 30 acres are still to be plowed on the station, and much of it must be completed before oats can be seeded. Seed corn at the station is testing well and the appearance of the shelled seed is excellent.

GREAT PLAINS AREA (South to North).

TEXAS

Amarillo Cereal Field Station, Amarillo (John F. Ross). No report.

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). March has been very dry and windy, even for this section.b Because of soil blowing, it was unnecessary to list the wheat varietal plats on March 24. This is to be regretted, but it could not be avoided as the plats were blowing badly and had to be stopped.

To date, 165 8-pound lots of Sunrise kafir, C.I. No. 472, have been sent out to farmers making inquiries regarding it. Most of these orders have been from Oklahoma, though one or more have been sent to Arizona, Colorado, Kansas, Missouri, New Mexico, and Texas. This should give Sunrise kafir a rather wide trial.

In addition to filling seed orders, the principal work recently has been thrashing sorghum and broom-corn heads for seeding this year and photographing sorghum heads. Germination tests have been started on seed to be used in the date-of-seeding experiments, as plats for the first date are to be seeded April 15.

The maximum temperature during March was 84° on the 14th; the minimum, -1° on the 7th. The precipitation during March was:o on the 11th, 0.02 in.; 12th, 0.12 in.; 25th, 0.27 in.; and 26th, 0.20 in.; a total of 0.61 inch. The average wind velocity from 8:00 a.m. March 27 to 8 a.m. March 28 was 26.4 miles per hour. During the same period on March 22 and 23 it was 25.5 miles per hour. Much of the wheat on sandy soil in the vicinity of Woodward was blown out.

KANSAS

Fort Hays Branch Station, Hays (A. F. Swanson). After an absence of nearly four months, the greater part of which was spent at Washington, D. C., the writer has returned to his work at the Hays Branch Experiment station. About twenty days were spent at Manhattan, where, in cooperation with the

Agronomy department, 2,600 heads of F_2 hybrid sorghums were classified according to certain outstanding characters. Six hundred heads finally were selected for seed, of which three hundred will be sown at Hays.

Soil blowing began March 15, followed by a higher wind March 18, when considerable damage was done to many fall wheat fields, particularly in the western half of the State. Other storms followed on March 22 and 27. Quick action with a lister and cultivator in roughening the ground saved the Cereal project from much damage. The greatest damage was done to the late seeding in the date-and-rate-of-seeding experiment with fall wheat. On these plats the growth of wheat was too small and the ground too bare to withstand the wind. A half-inch rain on March 22 did much to control the blowing of the soil.

All fall-sown wheat on the Cereal project passed through the winter in excellent condition. Six varieties imported from South Africa were completely winterkilled, although they withstood a severe cold snap early in the winter. These wheats have been sown as spring varieties. A winter durum wheat imported seven years ago from the Balkan States was 50 per cent winterkilled.

Barley, oats, and spring wheats were sown March 25 and 26. The following varieties were included.

Barley

Mariout, C.I. No. 261
Stavropol
Catami, C.I. No. 575
Beldi, C.I. No. 190
White Smyrna, C.I. No. 195
Himalaya, C.I. No. 62,
Meloy, C.I. No. 1176
Horsford, C.I. No. 507
Manchuria, C.I. No. 643
Coast, C.I. No. 690
6-rowed Kansas, No. 7117
6-rowed, Kans. No. 7010
Odessa, C.I. No. 182
Local 6-rowed.

Oats

Sixty-Day, C.I. No. 165
Fulghum, C.I. No. 708
Burt X Sixty-Day, C.I. No. 727
Kherson, C.I. No. 459
Burt, Kans. No. 5020
Red Texas, Kans. No. 5005
Aurora, C.I. No. 831
Iowa No. 105, C.I. No. 787
Iowar, No. 5218, C.I. No. 847

Wheat

White spring Kans. No. 520
Red Spring, Kans. No. 519
Preston, C.I. No. 3081
Prelude, C.I. No. 4323
Marquis, C.I. No. 3641
Acme, C.I. No. 5284
Kubanka, C.I. No. 1440
Marchani, C.I. No. 2235-I.

A few other varieties which were to have been included in the varietal test have not yet been received.

Charles R. Weeks, for four years the superintendent of the Hays Branch

Experiment Station, has resigned effective May 1 to become Secretary of the Kansas Farm Bureau with headquarters in Manhattan. His new position carries considerable increase in salary. His work at the station has been of great value to the people of western Kansas. Mr. Weeks has always heartily supported the experimental work on the station.

State Experiment Station, Manhattan (John H. Parker). (January). Mild weather prevailed during the first week in January with little rain or snow of any benefit to the wheat crop. The weather during the second week was also mild, with some snow. During the third week, mild weather continued and reports began to come in as to the serious need for moisture in the south central counties of Kansas. During the fourth week, there was a light snowfall over most of the State, with sleet in some sections.

(February). Mild weather prevailed during the first two weeks in February, with some rain in the second week. The third week was dry and clear, with unseasonably low temperatures on the 18th, going down to zero in some localities. Seeding of oats was begun in the southeastern counties.

The fourth week was mild and an increasing number of reports indicated that wheat in many parts of the State was severely in need of moisture. Some counties reported 10 to 15 per cent of their wheat winterkilled, while in the south central counties the estimates of dead plants ran as high as 60 per cent. In Stafford County much of the wheat had not come up.

(March). During the first week in March unseasonably cold temperatures prevailed and there was little rainfall of any benefit to wheat. The cold winds were unfavorable to wheat and there was some soil blowing. The indications were that 10 to 50 per cent of the wheat acreage will be abandoned in the southwestern and south central counties. Oats and barley seeding continued.

During the second week, the weather was warm and dry, except in the eastern counties, where fairly good rains fell. Extremely high winds prevailed on the 11th, 14th, and 15th, causing severe dust storms and soil blowing, especially in the southwestern and south central counties. Wheat in these counties was in poor condition and the damage from soil blowing seems to make it almost certain that a rather large percentage of the acreage will be abandoned. From one fourth to half of the oat acreage has been sown in the eastern counties and practically all of it in the southeastern part of the State. Barley sowing was general in the western counties.

Experiment Station Items.

The spring grain nursery was sown on Saturday, March 13. On Sunday, March 14, the most severe wind and dust storm which has visited Manhattan in more than a decade occurred. Little soil blowing occurred at the Agronomy Farm, but in the nursery considerable damage was done. It is not known how many of the several thousand rod rows and head rows of oats and barley were blown out or mixed, but undoubtedly some of the seed was scattered from one row to another. In addition to injury to the spring nursery, much damage was done in the winter wheat nursery. About half of the F_1 hybrid plants were covered and practically all of the third generation winter x spring wheat

hybrids were so severely blown and shredded as to preclude their recovery. Several rows of hybrids between Illini Chief and Kanred made for the purpose of studying resistance to Hessian fly also were severely injured. Extensive series of different winter wheat varieties from which it was planned to make tillering studies were destroyed. On plats and rows where the plants were spaced or where the rate of seeding was light, the injury was much more severe than in the rod rows and plats where seed was sown at the normal rate. The wheat sown with the furrow drill seemed to be much less injured than that sown in the usual way in adjacent plats. The furrows had been partly filled with wind-blown sand but the plants showed very little injury compared with those sown on the surface.

Mr. Ivar Mattson, superintendent of the Tribune Branch Experiment Station, has resigned and has been succeeded by Mr. G. E. Lowrey, agricultural instructor in the High School at Tribune.

Prof. C. C. Cunningham, who has for several years been in charge of cooperative experiments with farmers, has resigned, effective April 1, and will engage in farming in Butler County. While in the agronomy department, he published bulletins on corn, sorghum and alfalfa and also several technical papers on the relation of ear characters to yield of corn. He has an unusual knowledge of soil types and crop adaptations in Kansas and is able to deal very successfully with farmers, as well as to conduct careful experimental work.

Prof. L. E. Call left March 17 for Washington, D. C., to attend a meeting of the Advisory Board of the American Society of Agronomy and the National Research Council.

Prof. S. C. Salmon will spend the week beginning March 22 in various parts of Kansas, where cooperative experiments are being conducted. He will give special attention to securing information on winterkilling of different wheat varieties. He will also visit the Tribune Branch Station to outline the season's work there.

Mr. F. A. Coffman, of the Akron Field Station, who has been at Manhattan assisting in the cereal breeding work since February 1, left on March 19 for Akron, Colo.

A. F. Swanson, who has been at Manhattan since February 20, left on March 14 for Hays. While at Manhattan, Mr. Swanson took notes on about 2,500 F_2 heads of a Red Amber sorgo x feterita cross. About 300 heads were selected for use in head rows at Hays and an equal number for use at Manhattan. Seed of each of these heads will be smutted, thus eliminating all of the susceptible types. Previous work of Professor Melchers of this station and of Doctor Reed and Mr. Fetter of the Office of Cereal Investigations has demonstrated that feterita and milo are very resistant to kernel smut. The notes on the several characters studied are being tabulated and when this work has been completed it is expected that definite information will be available as to the manner of inheritance of certain head characters in the sorghums.

A. L. Hallsted, in charge of the dry-land agriculture work at the Hays station, spent several days at Manhattan during the week of March 14 in consultation with Professors Call and Throckmorton with reference to new work in soil fertility and soil tillage at the Hays station.

A. E. Getty, in charge of forage-crop work at the Hays station, spent several days at Manhattan (March 18-20) in consultation with members of the agronomy department.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). (March 23). I arrived at Akron at 2 o'clock yesterday afternoon. The severe wind storm general throughout the central west did not miss Akron. However, the damage done to fall wheat in this part of Colorado does not seem to have been as great as in western Kansas.

In inspection trip was made over the fall cereal nursery and field plat projects last evening. Considerable damage has resulted from the soil blowing, but it is believed that a good rain will save most of the wheat. The damage appears to have been greater in the plats of the last seedings of the rate-and-date experiment than in either the early seedings of this experiment or in the plats of the varietal experiment. Considerable damage was done to the nursery. Practically all of the loose earth has been swept away, leaving the soil around the plants in a hard, cracked condition. Some of the plants have died, due to the drying.

Although considerable damage has been done by the wind at the Akron Field Station, more damage has been caused in the sections to the north and east of Akron, as the soil in those localities is more sandy.

(March 31). Weather conditions in northeastern Colorado were very unfavorable during the last half of March. The past winter has been very dry in this part of the country, little moisture having been received since December. The windstorms of March 14 to 20 caused much soil blowing, which resulted in considerable damage to fall wheat. In the more sandy sections of northeastern Colorado, the damage resulting from these windstorms was greater than at the Akron Field Station. Wind-blown drifts of soil are seen quite commonly around Akron as the result of this storm, while in the sandy section to the north of Akron the soil is reported to have drifted nearly as high as the fence posts in many places.

Since my arrival at Akron, March 22, two light snows have fallen. As both of these snows were accompanied by considerable wind, very little of the snow remained on the fields.

The last ten days of the month were comparatively favorable for field operations. During this period much field work was done by the farmers in preparing land and in seeding spring cereals.

On the Akron Field Station, seeding of the cereal plat experiments was completed March 30. No spring nursery seedings have as yet been made.

The wind storms of March 14 to 20 did considerable damage to fall grain in both the field and nursery projects at Akron. Much more damage was done

to the nursery seedings than to the field plats. The injury to the rod rows and head rows was especially severe, and it is very likely that a large portion of this section of the nursery will be of little experimental value.

The field plat experiments with cereals consist of the following:

Fall-Sown Wheat.

Four fiftieth-acre plats each of the 15 varieties and strains of wheat in the following list, except Kharkov, C.I. No. 5549, were sown at Akron Field Station in the fall of 1919. Lack of space prevented the seeding of more than two plats of C.I. No. 5549. Half of the plats seeded of each variety were sown on land previously fallowed and half on corn stubble. The rate of seeding in each case was 3 pecks to the acre. The 3 peck seeding of Kanred in the September 16 sowing in the rate-of-seeding experiment is to be used also as the varietal seeding of that variety. Kharkov, C.I. No. 5549, and Blackhull were sown October 2; all other varieties on September 16.

Nebraska Hybrid,	C.I. No. 5147	Kharkov,	C.I. No. 1583
Buffum,	C.I. No. 3330	Kharkov,	do 5549
Turkey,	do 1571	Alberta Red,	do 5797
Ghirka Winter,	do 1438	Red Winter,	do 6213
Armavir,	do 1355-2-2	Minturki,	do 1507
Crimean,	do 1436	Blackhull (Clark's)	6251
Kharkov,	do 1442	Kanred,	C.I. No. 5146
Kharkov,	do 4207		

In addition to the varietal experiment, Kanred, C.I. No. 5146, was sown in a combined rate-and-date-of-seeding experiments on August 16, September 4, September 16, October 1, and October 17, at rates of 1, 2, 3, 4, and 5 pecks to the acre. As in the varietal experiment, each rate on each date was sown on 4 fiftieth-acre plats, 2 on fallow and 2 on corn stubble.

Sixteen varieties of Spring wheat were sown March 27 in replicated fiftieth-acre plats, two plats of each variety on fallow and two on cornstubble. All were sown at the rate of 4 pecks except one plat of Kota on each soil preparation and all four plats of D-5, which were seeded at the rate of 3 pecks to the acre. In addition, Arnautka, C.I. No. 1493, was sown at the rates of 3, 5, and 6 pecks. The varieties follow:

Prelude,	C.I. No. 4323	Kubanka,	C.I. No. 1440
Pioneer,	do 4324	D-5	do 3322
Converse,	do 4141	Acme,	do 5284
Galgalos,	do 2398	Golden Ball,	do 6227
Kota,	do 6248	Peliss,	do 1564
Monad,	do 3329	Marquis,	do 3841
Arnautka,	do 1493	Glyndon,	do 2873
Arnautka,	do 4064	Kitchener,	do 4800

One fiftieth-acre plat of each of the following varieties was sown March 27, except Golden Ball, Ruby and Red Bobs. Golden Ball was sown March 30 and the other two will be sown when the seed arrives. The land used in seeding these plats was cropped to potatoes in 1919. The rate of seeding was 4 pecks to the acre. Arnautka, C.I. No. 1493, was used as a border and for checks in this experiment, being sown in plats 1, 6, 11, and 17.

Erivan,	C.I. No. 2897	Laramie,	C.I. No. 6235
Preston,	do 3081	Power,	do 3697
Ghirka Spring,	do 1517	Haynes,	do 2874
Beloturka,	do 1520	Golden Ball,	do 6227
Arnautka selection	do 1493-7-12	Ruby,	
Tagenrog,	do 1570	Red Bobs,	
Peliss,	do 1584		

Rye and Emmer.

1. Giant Rye, 30
2. Rosen Rye, --

Four fiftieth-acre plats, two on fallow and two on cornstubble, were sown of Giant Winter rye, C.I. No. 30, on September 16. One 0.12-acre plat of Rosen Rye was sown October 17 on land fallowed in 1919. The rate of seeding for both varieties was 3 pecks per acre.

Four fiftieth-acre plats, two on fallow and two on cornstubble, of a variety of spring rye secured from Mr. M. F. Vance, a farmer living near the Akron Field Station were sown March 27. The rate of seeding was 4 pecks per acre. Mr. Vance states that he has grown this rye for a great many years and knows no name for it.

Two fiftieth-acre plats, one on fallow and one on cornstubble, were sown of white spring emmer March 30. The rate of seeding was 4 pecks per acre.

Spring Oats.

Four fiftieth-acre plats, two on fallow and two on cornstubble, were sown of each of the following varieties of oat on March 29. All of the plats were sown at the rate of 4 pecks to the acre.

Burt,	C.I. No. 293	Swedish Select,	C.I.No. 134
Albion,	do 729	Colorado No. 37,	do 617
Kherson,	do 459	Golden Rain,	do 493
Nebraska No. 21,	do 841	White Tartarian,	do 300
Black American,	do --		

One plat of each of the following oat varieties and selections was sown March 30 at the rate of 4 pecks to the acre. Kherson, C.I. No. 459, was used as a border and as a check, the outside plats and one in the middle being sown to this variety. The border plats of Kherson and the plats of Fulghum and Burt were one hundredth of an acre each; all other plats in this experiment contain a fiftieth acre. The ground on which this experiment was

sown was cropped to potatoes in 1919. Plats of Fulghum, C.I. No. 708, and Aurora oats will be sown on ground of this cropping when the seed arrives.

Cole,	C.I. No. 834		
Kherson selection,	C.I. No.		459-5-1-18
do	do	do	459-6-2-18
do	do	do	459-8-1-18
Sixty-Day,		do	165
Albion selection,		do	729-1-1-18
do	do	do	729-2-2-18
do	do	do	729-6-3-18
Burt		do	823
Fulghum,		do	839

One plat of each of the following varieties of barley was sown March 30. The land on which this experiment was sown had been cropped to potatoes in 1919. Hannchen, C.I. No. 602, was used as a border and as a check, the outside plats and the one immediately following the Hannchen selection being sown to this variety. The Hannchen borders and the Nepal selection were sown in hundredth-acre plats while all other plats in this experiment contain a fiftieth acre. All of the plats were seeded at the rate of 4 pecks to the acre.

Arlington Awnless Selection,	C.I. No.	702-4-1
Blackhull Selection,	do	878-4-2
Hannchen selection,	do	531-2-09
Ouchac selection,	do	658-1-2
do do	do	658-1-10
Horsford selection,	do	877-4-1
Nepal selection,	do	595-1-18
Gatami,	do	575

Spring Barley

Four fiftieth-acre plats were sown March 30th to each of the following varieties of spring barley except Nepal and Orel, of which two plats each were sown, lack of space preventing the seeding of additional plats of these two. Half of the plats seeded of each variety were sown on land fallowed the previous season and half on land cropped to corn. The rate of seeding was four pecks to the acre.

Blackhull,	C.I. No.	878	Horsford,	C.I. No.	877
Hannchen,	do	602	Baku,	do	709
White Smyrna,	do	195	Nepal,	do	595
Coast,	do	690	Orel,	do	351

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). The month of March was marked by mild temperatures, heavy winds, and slight precipitation. During the last two weeks the minimum temperature was 11° and the maximum 60°. At times the wind reached a velocity of more than 60 miles per hour. The precipitation amounted to 0.09 inch. The winter wheat suffered severe damage by the wind.

Because of the mild temperature, it was possible to accomplish a small amount of spring work.

Sheridan Field Station, Sheridan (Leroy D. Willey). No report.

SOUTH DAKOTA

Cottonwood Substation, Cottonwood (Manley Champlin). No report.

Vivian Substation, Vivian (Manley Champlin). No report.

Eureka Substation, Eureka (Manley Champlin). No report.

Highmore Substation, Highmore (E. S. McFadden). No report.

State Experiment Station, Brookings (Manley Champlin). No report.

NORTH DAKOTA.

State Experiment Station, Agricultural College, Fargo (W. E. Brentzel). No report.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.). No report.

Dickinson Substation (Ralph W. Smith). During the month of March the weather has been very changeable, varying in temperature from about -20° to 60°. On March 15 and 16 the worst blizzard that has visited the State since 1902 occurred. During the storm the wind velocity averaged 32 miles per hour for 24 hours and at times the wind was much higher. Only 4 or 5 inches of snow fell at this place. The total precipitation for the month was 0.18 inche

The ground is bare except for a few traces of snowdrifts and the windy weather recently has dried the fields, so that field work is beginning on farms and at the substation.

Because of the wide spread in price between durum and common wheat the acreage of durum wheat in this section will probably be smaller than usual. The acreage of corn will probably be much increased this year.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). Fall-sown wheat has been injured somewhat by the winter but it is too early to estimate the injury definitely. The fields have been too muddy to get on them to make a close examination of the wheat. If there is no further injury there will probably be a stand, however.

The heavier mulched plats in the straw-mulch experiments with fall wheat caught so much drifting soil during the windy period in January and February that it is doubtful whether the wheat will get through. The wheat on these plats on January 8, when the writer left for Washington, D. C., was better than on any other.

A freshet caused by the melting snow on March 12 and 13 ran across the plats in the cultivation experiment with fall wheat, washing out considerable of the wheat.

Mr. J. A. Clark's plan to increase the number of replicate spring wheat varieties from 15 to 20 and to obtain an acre cereal nursery, which was approved by Director Linfield, will probably be arranged for as soon as Supt. Osenbrug returns from Bozeman.

The precipitation for January, February, and March was 0.70, 0.66, and 0.39 inch, respectively, compared with 0.13, 0.71, and 1.20 inches for the corresponding months last year. The minimum temperatures for the month ranged from -22° on March 5 to 38 on the 21st, while the maximum temperatures ranged from 0 on the 5th to 58 on the 21st. The precipitation for March was 0.48 inch below the average for the past 22 years.

WESTERN BASIN AND COAST AREAS
(South to North and West).

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). Since last September, the beginning of the sowing season, until April 1, 9.23 inches of precipitation have fallen, which is 1.08 inches above the normal. From January 1 to April 1 the total rainfall was 4.25 inches, 0.17 inch above the average for this period. The ground was covered with not less than 6 inches of snow from November 8 to February 20, and the first snowfall occurred before the soil was frozen. This allowed all of the water from the melting snow to enter the soil this spring with no trace of run-off, leaving the soil in the best of tilth. Since February 20, about 30 of the 41 days have been stormy with temperatures below normal. The stands of grain were near 100 per cent when the snow went off, but since this time the alternate freezing and thawing of the saturated surface soil has caused a small amount of heaving, reducing stands somewhat but not to the point of real damage. Present indications point to a season of high wheat yields.

On the station all fall-sown grains have survived the winter with good stands. Winterkilling since February 20 has occurred to a small extent, but not enough to reduce yields.

On March 31, all preparations were made for making wind, evaporation, and temperature observations. The temperature readings this morning showed a minimum of 9°, and the evaporation tank was covered with 1 inch of ice. The ground is covered with snow, with several large drifts in the road to the station.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Harney Branch Station, Burns (Otil Shattuck). (March 18). The total precipitation for the month of January was 0.35 inch, and for February was 0.02 inch. This is 1.53 inches below the 5-year average for these two months. The snowfall was very light and went off early, leaving the ground bare early in February. Freezing temperatures have prevented farm operations to a large extent until recently.

Grain cleaning and manure spreading were the leading activities for the first ten days of March. On March 12, the disk- and spike-tooth harrows were started on the garden and manured plats on the irrigated series. Fall rye varieties on the irrigated plats are beginning to emerge. The wheat classification nursery will be seeded during the next few days and will consist of 1,100 five-foot rows.

The sage-rats are becoming quite numerous and the farmers are all after them with poisoned oats. Due to the lack of snow during the past winter it was impossible to poison the rabbits and from present indications all crops not under rabbit proof fences will be greatly damaged during the coming season

Mr. P. S. Weittenhiller, who owns a large farm near the experiment farm has secured a well-drilling outfit and has started drilling the first of a series of wells that he expects to complete during the season. Several farmers are seeding rye in the vicinity of the station. Some of these, however, are of the true "homesteader" type and are drilling the seed on unprepared land.

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman Co. Branch Station, Moro (L. E. Stephens). No report.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). Dr. Ruth F. Allen has completed the testing of 230 varieties of oats under infection with a strain of stem rust of oats. No variety has proved immune, but a limited number have been found fairly resistant. A number of strains of stem rust collected over the State are now in culture in connection with a study of stem rust of oats.

L. Y. Leonard has planted 1,071 different lots of grasses as seeds or seedlings in the grass plats at Berkeley. The list includes 13 tribes, 110 genera, and 365 species. The majority of the grasses are growing nicely but many of the subtropical species have failed to germinate.

Reports of excellent growing conditions have been received from all the substations. At Escondido the wheats are waist high and at several places early wheats are in flower. Rusts have appeared at Escondido, Riverside, and Berkeley.

Helminthosporiums are prevalent at all the substations in varying amounts. Rhynchosporium on barley is also present. Mildew is reported from all sections in wheat and oats. Septoria has appeared in San Diego County. Bacterial blight on oats is also prevalent in the Bay region.

Plant Introduction Station, Chico (W. E. Florell). During the past month weather conditions have been very favorable for cereal crops. There has been a well distributed precipitation of 5.15 inches, with moderate to cool temperatures. The culms of most varieties of wheat and barley have begun to shoot and are elongating rapidly. One variety of barley in the nursery, Corbel, C. I. No. 1113, is fully headed and others are in the boot. A number of Australian varieties of wheat are also in the boot. The oats are also making a vigorous growth, but have not developed as much as the barley or wheat. Flax is making a good growth but stands are thin and non-uniform.

The March 15 sowing of Dr. Harlan's date-of-heading experiment with barley has emerged with good stands. In the earliest sowings first heading (tips of heads or beards) has been observed in the following varieties:

Variety	Date Sown	First heading
Nekano Wase	Oct. 15	March 26
Manchuria	Nov. 1	March 28
Jet,	Nov. 1	March 29
Nekano Wase	Nov. 1	March 22
Nekano Wase	Nov. 16	March 28
Nekano Wase	Dec. 1	March 28
Nekano Wase	Dec. 15	March 29

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION).

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Vol. 12. April 20, 1920. No. 7.
Personnel (April 11-20 and Field Station (April 1-15) Issue.

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PERSONNEL ITEMS

L. R. Breithaupt, formerly in charge of cooperative cereal investigations on the Harney County Branch Station, Burns, Oreg., and more recently engaged in farming at Payette, Idaho, is now county agent in Malheur County, Oreg.

Charles E. Chambliss left Washington April 16 for Athens, Ga., Crowley, La., and other points in the Southern States, to confer with experiment station officials and supervise the sowing of the rice nursery on the Crowley Rice Field Station.

S. D. Gray, scientific assistant in Forage-Crop Investigations, in charge of the cooperative grass garden at Arlington Farm in connection with investigations of cereal rusts, resigned March 31, to engage in farming in Charles County, Md.

C. P. Hartley and J. G. Willier left Washington April 19 for Piketon, Ohio, where they will supervise the planting of corn in the breeding experiments conducted there.

Chris Koch, teamster at the Adams County Branch Station, Lind, Wash., has resigned, effective March 31.

Tom Pederson, teamster at the Cheyenne Field Station, Archer, Wyo., resigned April 12.

V. F. Tapke, assistant to Dr. G. M. Reed in smut investigations, recently visited the John B. Adt Company of Baltimore, Md., manufacturers of driers and pasteurizing machinery, to investigate the possibility of using some of the machines in the drying of treated grain or in the dry heat treatment of grain.

Miss Bonny M. Webber, who assists Mr. Rothgeb in grain sorghums investigations, was married April 10 in the Little Church Around the Corner, New York City, to R. P. Starkey of the Disbursing Office of this Department. She returned to the office April 19.

Freeman Weiss, who has been assisting in stem rust investigations at University Farm, St. Paul, was transferred April 19 to the Federal Horticultural Board. Mr. Weiss has been assigned to the leadership of the project on the eradication of the potato wart disease, with headquarters at the Potato Wart Laboratory, Freeland, Pa.

W. H. Weston, jr., arrived in San Francisco April 18 from the Philippines, where has has spent the past two years in the investigations of downy mildews of corn and related crops. He left immediately for Washington, taking 4 days leave en route.

Gus Wiebe, whose temporary appointment to assist Mr. Aicher with the seeding of the extensive barley and oat nurseries at the Aberdeen station was noted in the last issue of the Cereal Courier, is honor man of his class this year at the State University of Idaho. In a judging contest open to students of the University he won the loving cup awarded to the best judge of cereals.

PUBLICATIONS.

Page proof of Farmers' Bulletin 1103, "Growing Irrigated Grain in Southern Idaho," by L. C. Aicher, was read April 20.

Galley proof of Department Bulletin 842, "The Nematode Disease of Wheat Caused by Tylenchus tritici," by L. P. Byars, was read April 13.

Farmers' Bulletin 1092, "Prairie Rice Culture in the United States," by Charles E. Chambliss, was issued April 14.

Galley proof of the Journal of Agricultural Research article entitled "The Production of Conidia in Gibberella saubinetii," by James G. Dickson and Helen Johann, was sent to the authors on April 14.

Farmers' Bulletin 1083, "The Hessian Fly and How to Prevent Losses from It," by W. R. Walton, has just been issued. This should be of interest to the men in charge of field stations, particularly in sections which are subject to Hessian fly injury.

NOTES ON 1920 CROPS

The National Weather and Crop Bulletin, issued by the Weather Bureau for the week ending April 13, says:

"Another week of unfavorable weather for vegetation and farm work has been experienced in all sections of the country, except in the extreme West. The rain was beneficial in most of Florida and the far West, but more moisture is needed in parts of the Southwest. It was far too cool for vegetation in eastern and central districts, while cold and stormy weather was unfavorable for stock in most central and upper Rocky Mountain States and the upper Great Plains.

"Farm work has been greatly delayed and is two weeks or more behind the average in most Central and Eastern States. The soil is cold and wet and, in some places, the preparation for planting is being hastily and poorly done.

"The planting of corn is from one to two weeks later than the average date, and germination and growth were very slow during the week due to low temperatures. Planting was begun as far north as south-central Kansas and southern and eastern North Carolina. The work of preparing the soil was delayed in central districts, because of excess moisture, while dry weather delayed the work of planting in western Texas.

"The week was mostly cold and precipitation was moderate in most sections of the winter wheat belt. No material change in the progress and condition of this crop or other winter grains was reported, except for a general improvement in winter wheat in Kansas, and in some central Rocky Mountain districts, and parts of the far Northwest. Winter wheat continues in poor to only fair condition in most of the principal producing areas. The precipitation was beneficial in much of the Great Plains section and parts of the far Northwest, but it continued too dry in southwestern Kansas, while high winds did considerable damage on sandy soils in central and western Oklahoma. The grain crops made good progress in the central and southern Pacific coast districts and fairly satisfactory advance was reported in much of the South and also in the Middle Atlantic Coast States; although their progress was rather unsatisfactory in Texas.

"The weather continued unfavorable for seeding spring wheat, owing to persistent wet or frozen soil and this work is much behind the average season. Very little spring wheat was seeded during the week, except that fairly good progress was made in central Iowa. In an average year seeding begins by this date to the northern limits of the belt. The seeding of spring oats has been retarded also by unfavorable weather. Rice planting was begun in California and this work was being pushed in Louisiana.

The following is from the Modern Miller, Chicago, of April 17, 1920:

"Dispatches from Canada to the Modern Miller this week indicate that seeding conditions are seriously delayed. In Alberta sleet and ice will delay seeding another fifteen days. In Manitoba and Saskatchewar thawing and freezing are preventing field work, indicating not only delays, but a short acreage.

"A special investigation has been made in Illinois by entomologists who find 20 per cent of the wheat acreage fly infested and no one of the five known parasites has been found. There is serious prospect of fly damage, unless high winds and rain destroy the fly when it first becomes active. Similar conditions prevail in Indiana.

"Kansas conditions are unchanged and fairly favorable.

"In the Texas Panhandle the wheat is thin on the ground and lacks vigor.

"The trade should not lose sight of the fact that there will be a large carry-over. This was made clear by Mr. Julius Barnes in his statement to the trade some time ago. In this respect the United States is in a better position than Canada."

The Daily Market Report, Minneapolis, April 19, 1920, says:

"Generally, advices indicate better conditions in the winter wheat belt, although at best the situation is not favorable. Weather is not particularly favorable in any part of the grain belt, temperatures being below normal.

"There was moderate precipitation in the winter wheat belt, and a general improvement of the crop in Kansas. Light snow which melted rapidly, during the first part of the month was favorable to the crops, and in sections where the wheat was stooling and had greened up, the condition shows marked improvement. The vitality of the wheat which was affected by the dust storms is low, and probably a part of this will be included in the abandoned acreage.

"Texas reports moderate rains. The advance of the small grains has been slow, but the condition is, on the whole, satisfactory. Corn planting has been delayed by unfavorable weather, and much which was seeded will have to be replanted.

"Oklahoma reported that unseasonably low temperature and high winds retarded growth; frost damaged early planted corn; corn planting has been progressing favorably in the northern territory.

"Spring planting in the Northwest is still retarded by low temperatures and freezing nights, and in few localities has more than a start been made. As it approaches the first of May, farmers are more apt to seed to the coarse grains, which are safer, than to risk late planted spring wheat. As it is considered particularly desirable to make up the deficiency in winter wheat by an increased spring wheat production, this delay is unfortunate."

According to the Foreign Crop and Livestock Reports issued March 31 by the Bureau of Crop Estimates, acreages of winter wheat sown in various countries in the fall of 1919, with percentage figures showing comparisons with sowing the year previous, was as follows:

Spain, 9,511,000 acres, 91.6 per cent; France, 11,369,000 acres, 103.5 per cent; Rumania, 1,321,000 acres, 44.5 per cent; British India, 27,428,000 acres, 115.2 per cent.

The rye acreage figures are as follows: Spain, 1,930,000 acres, 106.8 per cent; France, 1,959,000 acres, 108 per cent; Belgium, 490,000 acres, 103 per cent; Rumania, 99,000 acres, 45.3 per cent.

Barley was sown in Spain on 4,206,000 acres, which is 98.9 per cent of the acreage sown a year earlier. Other fall-sown barley acreages reported are negligible. The Spanish Oat crop acreage is reported at 1,394,000, which is 87.4 per cent of the acreage sown in the fall of 1918. France shows an increase of 11 per cent to 1,833,000 acres.

EXAMINATION FOR SPECIALIST IN AGRONOMY.

The Civil Service Commission announces an examination for Specialist in Agronomy to fill a vacancy in the States Relations Service and positions requiring similar qualifications at entrance salaries ranging from $1,800 to $2,400 a year. The duties of the appointee to the position in the States Relations Service will consist of the preparation of technical abstracts for the Experiment Station Record of the current scientific literature pertaining to field crops. Familiarity with the principles and methods of research in plant breeding and crop production, as well as an ability to translate scientific French or German, are important qualifications. Competitors will not be assembled for examination, but will be rated on education, training, and experience, and on their facility in abstracting English articles. Applications must be completed not later than May 25, 1920.

Full details regarding this examination are contained in Announcement No. 297 of the Civil Service Commission. Any one who desires to take the examination should apply to the Commission for Form 2118, stating the title of the examination desired.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North).

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). No report.

NORTH CAROLINA

State Experiment Station, West Raleigh, and Substations (G. M. Garren). No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). No report.

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love). No report.

INDIANA

Indiana Agricultural Experiment Station, Lafayette (George M. Hoffer). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). Spring is rather late at Madison this year and field work has been correspondingly delayed. The weather is favorable now, (April 15), and field work is in full swing. Winter wheat has come through in good condition.

Leaf rust of wheat was noted April 15 by A. G. Johnson on wheat sent to Madison from Granite City, Ill. by H. H. McKinney. This wheat was taken from the field at Granite City March 28, and planted in the greenhouse at Madison on arrival. New uredinia of leaf rust were noted on an old green leaf April 12. The new pustules were apparently produced around an old lesion; hence, evidence of hibernating mycelium.

Septoria on old, green leaves of Turkey wheat was noted at Madison to-day (April 15). It has come through the winter in good condition and is ready for business.

Important results are being obtained in connection with the investigations on the effect of soil temperature and soil moisture on the development of certain phases of the Fusarium blight of wheat and other cereals.

Dr. A. G. Johnson returned to Madison April 4 after an extended stay in Washington, D. C. While there he assisted in writing summaries of survey data of the diseases of cereals and forage crops in connection with the Office of Plant-Disease Survey.

H. H. McKinney is still at Granite City, Ill. He is finding some recurrence of the so-called take-all in the experimental plats there.

J. C. Brinsmade, jr., en route from Washington, D. C., to Mandan, N. Dak., spent April 9 at the Madison office in conference with Messrs. Johnson, Reddy and Woodworth, relative to the flax disease work.

Miss Helen Johann is spending several weeks at her home in Canton, Mo.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). As a result of late seeding and an open winter, wheat in Missouri is in unusually poor condition. Hessian fly is reported in several counties and much winter wheat has been plowed under.

The first two weeks of April have been unusually cold and rather wet. We have been particularly unfortunate at Columbia and so far have been unable to sow our experimental plats of oats and barley. We will probably put in these plats this week, about three or four weeks later than usual. Spring seeding over the State as a whole is about half completed.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

GREAT PLAINS AREA (South to North).

TEXAS

Amarillo Cereal Field Station, Amarillo (John F. Ross). No report.

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). No report.

KANSAS

Fort Hays Branch Station, Hays (A. F. Swanson). Since April 1 we have had both wintry and balmy spring weather. About a half inch of moisture has fallen and on April 10 there was another severe wind storm. Early-sown winter wheat has stooled heavily and is making some growth, but a good rain will soon be needed. All spring wheat, oats and barley, on the Cereal project, have emerged and are doing well.

The Eighth Annual Cattleman's "Round-Up" was held at the station on April 10. It is estimated that 1,100 farmers attended. A number of prominent

speakers were on the program. In a feeding experiment just completed, the "comparative feeding values of an acre of Pink kafir with the heads on and with the heads off, both in the silo and in the shock.

It was found that:

1. One acre of kafir made into silage after the heads had been removed had a feeding value equivalent to 2.2 acres in the form of dry stover after the heads had been removed.

2. One acre of kafir made into silage with the heads on had a feeding value equivalent to 2.58 acres in the form of dry fodder with heads on.

3. One acre of kafir made into silage after the heads had been removed had a feeding value equivalent to 1.16 acres in the form of dry fodder with the heads on in spite of the fact that this kafir produced 30 bushels of grain per acre.

4. Kafir made into silage after the heads had been removed proved to be the most efficient form in which it was fed, as the following table will indicate.

Cash value of the kafir consumed in producing 100 pounds of grain based on kafir stover at $6 a ton and kafir grain at $1.50 a bushel.

Kafir silage (heads on)	$8.93
Kafir silage (heads off)	3.46
Kafir stover (heads off)	7.47
Kafir fodder (heads on)	22.43

The county agricultural agents of western Kansas held their annual 3-day conference at the Fort Hays Branch Experiment Station April 11-13, after attending the "Round-Up." A valuable feature of the conference was the county agents who were supplied with data from the three cooperative projects on the station, which in turn can be given to farmers. During the conference an inspection trip was made over the various projects and the experiments under way explained in detail.

H. L. Kent, director of vocational education in the Smith-Hughes schools in Kansas, and principal of the School of Agriculture at the Kansas Agricultural College, has been appointed superintendent of the Fort Hays Branch Experiment Station, effective May 15.

State Experiment Station, Manhattan (John H. Parker). No report.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). Weather conditions in eastern Colorado have been very unfavorable for spring work during the first half of April. Several severe blizzards have occurred and the ground has been covered with snow much of the time. The period has been one of unusually low temperatures. A minimum for the period of -3° F. was recorded April 4. Low temperatures have retarded the germination of cereals sown in March, and emergence had not occurred April 15.

Due to the low temperatures and the covering of snow on the fields, completion of spring grain seeding has not been possible. Only during the last two days of the period was it warm enough to permit any noticeable growth of fall-sown grain.

During the first half of April, a spring grain nursery of some 600 rows was sown. Enough seed has been prepared for seeding approximately twice as many rows as have been sown. The total area being used for nursery seedings at Akron this season, is between 1.5 and 2 acres.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). The spring is very backward. Large snowdrifts are still lying along the fences. The winter grain on fallow is practically blown out while that sown in oat stubble is in good condition. The soil preparation for winter wheat seeded in oat stubble consisted in plowing and harrowing for the oats, with double disking at seeding times. The oats at no time covered the ground and there was a considerable growth of Russian thistles. It is evident that the Russian thistles served as a protection against soil blowing and as a factor in holding the snow.

Sheridan Field Station, Sheridan (Leroy D. Willey). No report.

SOUTH DAKOTA

Cottonwood Substation, Cottonwood (Manley Champlin). No report.

Vivian Substation, Vivian (Manley Champlin). No report.

Eureka Substation, Eureka (Manley Champlin). No report.

Highmore Substation, Highmore (E. S. McFadden). We are having a rather backward spring in this section. The ground freezes nearly every night and remains frozen until the middle of the afternoon. This has made it impossible to accomplish much field work. However, by careful planning, we have succeeded in sowing April 15 plats in the date-and-rate-of-seeding experiments with wheat, oats, barley, and flax. No other seeding of field plats has been done on the station.

We have had two or three ideal days for work in the nursery, and they have been used to good advantage. The nursery includes 720 headrows, mostly hull-less and awnless barleys of hybrid origin. A few of the rows represent rust-free wheat selections from a cross between Marquis and a rust-resistant selection of Iumille. In spite of the fact that Iumillo parent has an amber kernel, most of the durum selections from this cross have red kernels, the red color apparently coming from the Marquis parent. The nursery also contains 360 rodrows of wheat, barley, and rye, besides about 60 eight-rod-rows which represent promotions from the rod-row class of last year.

Winter wheat has been badly injured by the alternate freezing and thawing this spring. Most of the winter rye appears to be in good condition, but has made but little growth. Much of the winter grain did not germinate last fall on account of the soil being too dry. A good rainfall at just the right time to start all of the winter grains in the varietal experiments, but only one

date of seeding showed above ground before winter set in.

We have had no precipitation of real value thus far this spring. However, the soil is sufficiently moist for germination and is in excellent condition for working. Wind velocity at Highmore has either been considerably below normal this spring or else I have become so accustomed to heavy gales that I do not notice them as much as formerly.

Farm help is very scarce in this section. The only extra help we have at present is a school boy who works for us after school hours and Rev. H. J. Thornton of the Congregational Church, who has kindly consented to help us on an occasional afternoon.

State Experiment Station, Brookings (Manley Champlin). No report.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzel). Mr. J. C. Brinsmade, jr., visited the station early in the week in the interest of cooperation on flax investigations between the Northern Great Plains Field Station and the North Dakota Agricultural Experiment Station.

The spring is opening nicely and in a short time numerous field experiments will be begun. Arrangements have been made for some cooperative work between the Office of Cereal Investigations and this station on wheat and oat rusts. To carry out this work a few rust nurseries will be sown this spring. It is planned to have rather extended experiments dealing with the effect of seed treatment on flax wilt. Experiments with wilt, canker, and other flax diseases will be continued this summer.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, jr.). Drouth conditions have continued exceptionally severe during the past winter. Precipitation for the last four months of 1919 was only 2.91 inches, following an extremely dry crop season. Precipitation for the first three months of 1920 was only 0.97 inch, and for the first half of April was only 0.04 inch. Therefore, the prospects are not promising for a favorable crop year. Many of the young pines and other evergreens which survived the last few unfavorable years died during the past winter.

The frost is practically all out of the ground and spring field work began the first of this week. Flax in the date-of-seeding experiment was sown April 15. Land has been prepared for the wheat varietal plats, which will be sown April 17.

Maximum temperature for the first half of April was 60°, recorded April 15; minimum, 0°, April 4.

Dickinson Substation (Ralph W. Smith). Changes of temperature have been frequent this spring, but without an abundance of moisture. The temperature fell to about zero early in the month and has risen to about 60 degrees during the warmest days.

During the past week some disking, dragging, and seeding has been done when the ground did not freeze too hard. At the Substation a few increase plats of wheat and oats have been sown and the seeding of the rotation and cereal plats will proceed as soon as the condition of the ground permits.

A snow and sleet storm occurred April 14 which supplied 0.21 inch of moisture, making the total for the first half of the month, 0.31 inch.

In a neighborhood a few miles from the Substation the discovery of numerous larvae of the sugar beet web worm in the soil caused some worry among the farmers. Some had decided to sow nothing on the infested fields because of fear of having crops destroyed by the worms, but were reassured by the fact that the Russian thistles are eaten by these worms in preference to most field crops. Reports have been received of young grasshoppers appearing at several places this spring. It is noted expected, however, that they will be as numerous here as during the past two years, not having been very numerous last fall.

Stewart Lockwood, extension specialist in entomology, visited the Substation this week, investigating the sugar beet web worms.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). (April 17). The precipitation for the first 16 days of April has been 4.04 inches, which breaks the April precipitation records for the past 22 years. The greatest previous April precipitation, 2.85 inches, occurred in 1900. The precipitation so far this month exceeds the average for any other month during the past 22 years by 1.01 inches. Over half (2.18 inches) of the precipitation so far this month has fallen during the last three days.

The surface soil at least is well soaked. There is a covering of 7 or 8 inches of snow on the ground at present and the snow is still falling. The fields have been muddy all spring, making it practically impossible to make a close examination of the experimental plats. The maximum temperature so far this month has been 49°, on April 8; the minimum, 6° on April 5.

Much of the winter wheat sown on fallowed land is weak. Most of it is alive, however, but another period of freezing weather without a snow covering would probably kill it. Wheat which was sown in stubble and volunteer wheat in stubble looks quite good. This is true not only on the Station but also throughout this section.

The wheat in the fields look better than the wheat in the experimental plats, all of which was sown on fallowed land, but the field wheat was sown earlier than the experimental plats.

WESTERN BASIN AND COAST AREAS
(South to North and West).

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). Since April 1, we have had 1.57 inches of precipitation, of which 1.10 inches have fallen since the 13th and the storm still continues in the form of snow. This rainfall, together with the unusual amount during March, has made the soil so wet that team work has been almost impossible on the station. Half of the spring wheats in the varietal experiment were sown April 12, but it is quite probable that the remainder will not be sown for several days.

The winterkilling of fall-sown grains mentioned in the report mailed April 1, was most severe in fields of Kofad wheat. On the station this variety suffered most in all experiments. Winter oats were again all killed, and winter barley in the nursery is nearly all dead. The winter barleys in plats were not damaged as much as the nursery sowings. The alternate freezing and thawing which occurred during the latter part of February and through March, is responsible for this injury.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). During a recent rainy period a total precipitation of 1.05 inches occurred. This rain will be of great benefit to all crops, and will insure stands of spring-sown crops. All preparations have been made to irrigate land intended for spring seeding, but this will not now be necessary. Farmers generally are jubilant, and are planning to put in large acreages.

OREGON

Harney Branch Station, Burns (Obil Shattuck). No report.

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). The grain in the rust nursery is growing well and there is no cause for complaint about the stand. Inoculation has been started in the nursery and everything points to a successful season as far as the testing of susceptibility of varieties is concerned.

The greenhouse work is progressing somewhat more steadily now and during the next three months I will have more time to devote to this work, so that we should accomplish more during the spring than heretofore this season. Thus far this season two new species of grass have been established as hosts of Puccima glumarum through inoculation in the greenhouse. These species are Elymus robustus and E. australis. This increases the total number of grass hosts of this rust to thirty-three species distributed in seven genera as follows: Agropyron, 6; Elymus, 7; Hordeum, 5; Hystrix, 1; Sitanion, 3; Phalaris, 1; Bromes, 10.

It is hoped also that there will be some time during the next three months to devote to the histological problem which had been planned. Some material has already been fixed and is being intedded preparatory to sectioning.

At one overwintering station on the Oregon Agricultural grounds, stripe rust was found sporulating on Bromus marginatus on February 21.

Sherman CO. Branch Station, Moro (D. E. Stephens). (Report for March). March weather was cold, dry, and windy. Field work began about the middle of the month, but on account of bad weather, not very much was accomplished until the last week in March, when most of the grains in the varietal experiments were sown. The total precipitation for the three months, January, February, and March, was only 1.58 inches. The lowest ~~temp~~ temperature recorded during March was 24° on the 31st; the highest temperature was 60° on the 19th and 22d.

The condition of the winter wheat crop in eastern Oregon is not quite up to normal on account of the unfavorable weather during the winter and early spring. Some reseeding has been necessary on account of failure to obtain good stands and considerable damage has been done recently to winter wheat on the sandy soils near the Columbia River by the blowing of the soil. In Sherman County it is estimated that about 5,000 acres of winter wheat were blown out. Marquis wheat is generally being used to resow thin stands or blown-out fields of Turkey wheat. Good stands were obtained for all winter wheat sown on the Station, except the latest sowings in the rate and date experiments, which are considerably thinner than the early sowings.

Mr. M. M. Alacante, a graduate of the Oregon Agricultural College has been employed for soil moisture and nitrate investigations on this Station. This work was begun on April 1. The per centage of moisture in soil fallowed last season and sown to wheat last fall is approximately the same as that of similar ground a year ago on the same date. The moisture content of ground cropped in 1919 is somewhat less than similar ground last year at the same date. The winter and spring precipitation has penetrated the stubble ground about 3 feet. The average moisture content on April 1 of the soil of a number of plats fallowed last year and sown to Turkey wheat is 13.5 per cent. In 1919, the properly cultivated plats in the tillage experiments that contained 13.5 per cent moisture the first week in April produced from 35 to 38 bushels of winter wheat per acre with no moisture of benefit to the plants after that date.

(April 15.). After a long cold, dry spell, we had nearly an inch of rain last week and crop prospects are better. Spring grains sown nearly a month ago have not yet emerged.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). No report.

Plant Introduction Station, Chico (V. H. Florell). The first half of April has been marked by very favorable growing weather for cereals. Temper-

atures have been moderately cool, with a few warm days and several good rains.

A considerable number of varieties of all cereals have begun heading. The earliest first date of heading in wheat, April 1, was recorded on the Sunset variety (Australian), Hard Federation (also Australian) began heading on April 8. The Indian wheats as a group are the earliest, 60 per cent of them having begun heading. Most of the barleys have begun heading, and this crop is making the most rapid growth. Considerable lodging is evident in the barley nursery since the rain and wind storm of yesterday and to-day. With favorable weather most of this will probably rise again. The Fulghum and Burt varieties of oats have begun heading, and the earliest varieties of flax have begun blossoming.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION).

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Vol. 12. April 30, 1920. No. 8.
Personnel (April 21-30) and Project Issue.

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SPECIAL CONTENTS

Signed Resignations Necessary on Leaving Service.
Amendment to Property Regulations.
Condition of 1920 Crops.
Flax Experiments at Mandan, N. Dak.
Progress of Barberry Eradication Campaign.

PERSONNEL ITEMS

Carl D. Adams has been appointed field assistant in barberry eradication effective May 1, and will have temporary charge of the barberry eradication campaign in Wisconsin, succeeding T. T. Haack. Mr. Adams is a graduate of the Kansas Agricultural College, and has recently been county agricultural agent in Milwaukee County, Wis. He was a field assistant in the barberry eradication campaign from March 21 to June 30, 1919.

Henry Burns has succeeded Tom Pederson as laborer at the Cheyenne Field Station, Cheyenne, Wyo.

T. T. Haack, assistant State leader of the barberry eradication campaign in Wisconsin, has resigned, effective May 6, to accept a commercial position.

Wright L. Hess, who has been assistant state leader of the barberry eradication campaign in Wyoming during the past year, resigned April 15 to return to his homestead at Shawnee, Wyo.

Mrs. Agnes Hoffman was absent from the Office for several days following April 20 because of the death of her father, and has since been confined to her home by illness.

Miss T. Enid King, who has been assisting Dr. C. E. Leighty in Eastern wheat investigations, resigned May 1, to return to her home in Columbus, Ohio.

F. D. Richey left Washington April 25 for Urbana, Ill., where he will confer with officials of the Illinois Agricultural Experiment Station with regard to cooperative experiments with corn. From Urbana he will go to Arkansas to supervise the planting and cultivation of corn experiments.

John F. Ross, superintendent of the Amarillo Cereal Field Station, Amarillo, Texas, spent the last ten days in April at Fort Worth, Texas, studying methods of grain grading in connection with the grain supervision work of the Bureau of Markets.

J. H. Rushmeier has succeeded Chris Koch as laborer at the Adams County Branch Station, Lind, Wash.

Miss Vera M. Vincent has been appointed, effective May 1, to assist in the cooperative experiments with cereals at the Kansas Agricultural Experiment Station, Manhattan, Kans.

Dr. W. H. Weston, jr., who has been in the Philippines for the past two years in connection with investigations of the downy mildews of maize and related crops, arrived in Washington May 1, accompanied by Mrs. Weston.

VISITORS

Prof. C. Larsen, Director of Extension in the South Dakota College of Agriculture, was an Office visitor April 22, when he discussed arrangements for the cooperative barberry eradication campaign in that State.

Gordon D. Randlett, Director of Extension in the North Dakota Agricultural College, Fargo, N. Dak., called at the Office April 30 to confer in regard to the continuation of the barberry eradication campaign in North Dakota.

Dr. Issa Tanimura, Commissioner of Livestock for the Japanese Government, was a visitor at the Office April 22. Dr. Tanimura was especially interested in obtaining samples of varieties of oats, corn, and rye for testing in Japan. He is a graduate of Yale University and has made a number of visits to the United States since graduation. He is especially interested in the growing of foreign and grain crops suitable for feeding to livestock.

PUBLICATIONS.

Page proof of an article entitled "Production of Conidia in Gibberella saubinetii," by James G. Dickson and Helen Johann, which is to appear in the June 1 issue of the Journal of Agricultural Research, was read April 28.

Second page proof of Farmers' Bulletin 554, revised edition, "Pop Corn for the Market," by C. P. Hartley and J. G. Willier, was read April 23.

Galley proof of a paper entitled "Rust in Seed Wheat and Its Relation to Seedling Infection," by C. W. Hungerford, was read April 28. This paper is to appear is to appear in the June 15 issue of the Journal of Agricultural Research.

Department Bulletin 836, "Broom Corn Experiments at Woodward, Oklahoma," by Benton E. Rothgeb and John B. Sieglinger, was issued April 27.

Galley proof of Farmers' Bulletin 1119, "Fall-Sown Oats," by C. W. Warburton and T. R. Stanton was read April 23.

Page proof of a paper entitled "The Philippine Downy Mildew of Maize," by Dr. W. H. Weston, jr., was read April 26. This is to appear in the May 1 issue of the Journal of Agricultural Research.

SIGNED RESIGNATIONS NECESSARY ON TERMINATION OF SERVICE.

All employees of the Office will please note that a signed resignation must be submitted on leaving the service of the Department. It is especially important that field men authorized to employ laborers keep this in mind. Recently, three laborers have been allowed to leave the field stations without obtaining signed resignations from them. These resignations should show the date on which service terminated, the reason for the resignation, and if the reason was to accept another position, the nature of the position and the salary paid. The date should be the last day on which service was performed. A resignation signed effective April 30, for instance, would mean that the employee worked to the end of the day on April 30.

It is especially important that the Office be notified promptly of intended resignations. If the date on which a resignation is to take effect is known in advance, the resignation can be signed in advance and sent to this Office at any time in advance of that date. This enables us to obtain credit promptly for the salary for the remainder of the fiscal year after the resignation becomes effective.

At the same time, it must be understood that no appointments can be made until full information concerning the proposed appointee is submitted. This information must cover all of the points on the appointment questionnaire prepared and distributed by the Office. Appointments cannot be dated back. A man may be allowed to work not to exceed thirty days without appointment, but request for appointment should be made promptly as soon as the name of the proposed appointee is known.

AMENDMENT TO PROPERTY REGULATIONS.

Printed copies of the following memorandum have just been received:

MEMORANDUM NO. 299.

Paragraph 31 of the Property Regulations of this department is hereby amended to read as follows:

31. Purchase from Government employees prohibited.--No supplies or property for the use of the department shall be purchased from any of its employees without the approval of the Secretary. The request for such approval must in each case be accompanied by a statement in writing from the officer certifying the voucher showing the necessity for the purchase and indicating specifically that the purchase from the employee will be more advantageous to the Government than a purchase from any other source.

D. F. Houston,

Secretary.

CONDITION OF 1920 CROPS.

Probable Demand for Spring Wheat.

On April 26, the Department of Agriculture issued a statement with regard to the condition of the winter wheat crop, the world supply of wheat, and the probable demand for the 1920 crop. In this statement it is shown that present conditions indicate a yield of winter wheat nearly 250,000,000 bushels less than that of a year ago, and the possibility of a further decrease in the production due to insect damage and other causes is suggested. While there is a carry-over from the 1919 crop of approximately 150,000,000 bushels, practically double the usual figure, this is for the most part winter wheat of low milling quality. Stocks of spring wheat are much less than a year ago. Because of unfavorable conditions for field work this spring and the serious shortage of farm labor, it appears that the sowing of spring wheat is likely to be curtailed. The statement closes with the following sentence:

> "While there are many factors yet undetermined which are likely to affect the production this year, the existing shortage of spring wheat of satisfactory milling quality indicates the probability of continued active demand for high-grade spring wheat from the new crop."

World-Wide Wheat Shortage Indicated.

A world-wide shortage of wheat during 1920 is indicated in a report by the American Agricultural Trade Commissioner representing the Federal Bureau of Markets at London. This report summarizes information on the present wheat and flour supply and prospects for the growing crop of wheat throughout the world. It is stated that a large quantity of wheat is stored in southern Russia for export, the estimates varying from 35,000,000 to 140,000,000 bushels, but the railroads are without equipment to move this wheat from the interior to the seaboard, and it is practically impossible to trade with the Russian cooperative societies and soviet governments under present conditions. The crop recently harvested in Australia was a partial failure because of drouth, and exports from that country will be comparatively small, consisting almost entirely of wheat stored from previous years.

General Crop Notes.

The "Weekly Crop Notes of Field Agents for the Week Ending April 24," issued April 29 by the Bureau of Crop Estimates, indicates a backward season over practically the entire United States. In the South, spring work is late and in some sections it is reported the land will be planted with but little preparation. In the Northeastern States work is further advanced than in other sections, delay apparently being due more to labor than to weather conditions. In the North Central States, work is far behind the usual schedule, Indiana and Illinois reporting it fully three weeks late. Flooding is reported in Ohio and Indiana. North Dakota reports seeding fully a week later than usual, and South Dakota says field work is nearly two weeks late. Oklahoma reports damage to growing crops by high winds. Washington reports crop conditions improved by rains, but plowing delayed.

Corn planting is well advanced in the Southern States; Louisiana reports unsatisfactory germinations. In North Carolina and Tennessee, little planting is finished. Illinois, Missouri, and Nebraska report that plowing for corn has been delayed by heavy rains.

Improvement in the condition of the winter wheat crop is reported from some States, particularly Maryland, Virginia, and Nebraska. In Ohio, Illinois, Indiana, and Iowa, damage from Hessian fly and winterkilling and other causes is reported. Washington reports considerable improvement since April 1, due to recent rains.

The spring wheat States in general report probable decreases in acreage due to unfavorable weather for seeding. North Dakota reports only 20 per cent of the seeding completed. A large acreage will be sown in northern Illinois if weather conditions permit.

In the Southern States fall-sown oats are heading, and Georgia, Florida, and South Carolina report conditions good to excellent. In the North Central States seeding generally has been delayed by wet weather. Ohio reports poor germination. In North Dakota and South Dakota practically no oats have yet been sown.

Pennsylvania, Ohio, and Indiana report slight improvement in the rye crop, and Wisconsin and Minnesota state that recent rains have been a benefit. In North Dakota the conditions are about normal, but farmers fear damage from grasshoppers.

Minnesota reports prospects for at least an average crop of flax, while North Dakota states that fear of grasshoppers may decrease the acreage of this crop in the western portion.

Reports of shortage of farm labor are very general, the North Dakota agent stating that the wages demanded range from $65 to $100 per month with board. Of the reports which include mention of farm labor, only the one from South Dakota indicates that there is not a keen demand.

Modern Miller Report on Wheat.

The Modern Miller of May 1, says:

"Special reports to the Modern Miller confirm previous advices of a winter wheat crop materially under that raised last year. However, they call attention to the fact that the crop has been benefited by the period of wet and cool weather. Reports from Kansas are the most optimistic and estimate the condition of the crop from 75 to 100 per cent of normal. In this State there is little evidence of Hessian fly thus far, but damage by wind before the wet period set in was material.

"Conditions are spotted in Illinois and estimates range from 50 to 100 per cent, but mainly around 75 per cent. The weather has been against Hessian fly during the egg-laying period but damage from this source on early sown wheat is apparent.

"Indiana reports place conditions of the crop from 60 to 90 per cent. There is less complaint of fly from this State but the extent of the pest will be determined by weather conditions during the next two months. Oklahoma advices are generally more favorable. Missouri has not much to say about fly but the effect of severe winter on the wheat there is more apparent."

Winter Wheat in Kansas.

Following is a summary of a report issued April 26 by Secretary J. C. Mohler of the Kansas State Board of Agriculture:

The estimated area sown to winter wheat in Kansas during the fall of 1919 was 8,951,834 acres, which is 22.9 per cent less than the seeding of the year before. Reports now indicate that 17.4 per cent of last fall's sowing is worthless or so unpromising that the land will be used for other crops. This leaves 7,391,718 acres of growing wheat in the State, with a general average condition of 78.4 per cent based on 100 as representing satisfactory growth and development. A year ago similar reports showed 10,758,000 acres of wheat in Kansas with a condition of 99.32 per cent. The prewar 5-year average was 6,303,000 acres, with a condition of 86 per cent.

There was comparatively little winterkilling of wheat, the loss being caused mainly by dry weather during the fall and winter and high winds this spring. Much of the wheat was sown last fall on poorly prepared seed beds because of insufficient moisture. Present conditions for growth are excellent, except in the southwestern part of the State, where the moisture supply is still short. The largest losses of wheat are reported from this section and from the south-central countries. In general, wheat in the northern half of Kansas is much better than in the southern half, due to a better moisture supply last fall.

The acreage estimated in the fall of 1919 included 1,262,000 acres of volunteer wheat, mostly in the western third of the State. Probably 25 per cent of the abandoned acreage in the western counties is volunteer, and that which remains is much less promising than wheat sown on prepared seed beds. Very little insect damage is reported, although two or three severe local infestations of Hessian fly are noted by correspondents.

The Washington Wheat Crop.

The Modern Miller of April 23 says:

"There have been some rains in the dry wheat district of eastern Washington. The Palouse country reports a soaking shower, regarded as good service. Similar falls were reported in Grant and Whitman counties. At Othello the heaviest fall since 1910 was reported. These reports cover the larger portion of the wheat belts of the state excepting the Walla Walla district. Precipitation in the Spokane district to date is 20 per cent under normal. The soil there is in good condition for plowing. The fall wheat

acreage is 20 per cent under normal. Spring acreage is about 15 per cent below normal Much fall acreage must be reseeded.

"In the Walla Walla district the soil is now in excellent condition. The condition of wheat is below normal on account of weather.

"The area of wheat planted in the Lewiston, Idaho, district is under normal and summer fallow has been reduced by an increase in the acreage of spring wheat."

PROJECT REPORTS

211-G. FLAX INVESTIGATIONS.

FLAX EXPERIMENTS AT MANDAN, N. DAK., IN 1919.
(J. C. Brinsmade, Jr.)

The flax work at the Northern Great Plains Field Station, Mandan, N. Dak., in 1919, comprised varietal and date and rate of seeding experiments with common varieties, nursery trials of varieties from different parts of the world, and studies of hybrids and disease-resistant strains. The principal change from the previous year's experiments was an increase in the extent of the studies on flax diseases, especially flax wilt. The season was the fourth in succession of subnormal rainfall and the third consecutive one of severe drouth.

In the varietal and date and rate of seeding experiments weeds were so numerous that it was necessary to weed all plats by hand in order to save the crop for seed production. The results, though unsatisfactory as to yields and comparisons, indicated more strongly than ever that control of weeds in connection with the growth of flax is one of the most important problems to be solved.

The season's work on flax hybrids gave evidence that the flax plant is comparable with the best plant and animal material in affording numerous diverse characters for genetic study. The data obtained, when assembled for publication, should constitute a valuable contribution to the literature of genetics.

The results of perhaps the greatest importance and value were those on the flax-wilt disease. The progenies of selections made on diseased land in 1918 when again grown on diseased land, proved to be resistant to the disease in varying degrees. Most common strains not selected for wilt resistance were completely destroyed by wilt on diseased land. Some unselected strains from

different parts of the world proved to be resistant to disease, while others were wholly destroyed. The land on which the hybrids were grown was badly inoculated w th the disease on account of having had flax on it five years before. Hybrids between resistant strains were highly resistant. In crosses with one resistant parent the progeny were somewhat resistant, and in crosses between two susceptible parents the progeny were completely destroyed by the disease.

As a result of conclusions drawn from the flax work at Mandan during 1919, special consideration is given to weeds and disease in the planning of all future experiments, for it is evident that the whole future of flax-seed production in this country depends on the successful control of these two factors.

Following is a list of the experiments conducted in 1919:

Varietal experiments
- Clean land,
  - Plats
    - 18 varieties in fiftieth-acre plats replicated 5 times.
    - 14 varieties in single fiftieth-acre plats.
  - Nursery,
    - 120 varieties and selections in triplicated 2-rod rows.
    - 120 varieties and selections in single 1-rod rows.
    - 120 varieties and selections in single 5-foot rows.
- Diseased land
  - Plats
    - 2 disease-resistant varieties grown continuously on the same tenth-acre diseased plats for five years.
  - Nursery,
    - 200 varieties and selections in 5-foot (approx.) rows on diseased land.
    - 3 varieties in triplicated lime test on diseased land.

Date of seeding.
- Five dates of seeding in fiftieth-acre plats triplicated.

Rate of seeding.
- Five rates of seeding in fiftieth-acre plats triplicated.

Hybrid studies.
- 250 (approx.) rod rows of second generation hybrids and parent plants.

Disease studies on flax wilt and canker.

?18-A. INVESTIGATIONS OF IMPERFECT AND SAC FUNGI.

(Dr. A. G. Johnson, Pathologist in Charge.)

STUDIES OF FUSARIUM BLIGHT.

Wisconsin Agricultural Experiment Station, Madison, (J. G. Dickson).

The Relation of Soil Temperature to Fusarium Blight of Wheat and Corn.

Important experiments on the relation of soil temperature to Fusarium blight of wheat and corn have been in progress at the Madison, Wisc., laboratories during the past winter and early spring months. The results of these studies indicate that mycelial growth of the scab organism, Gibberella saubinetii, when cultured in the Altmann incubator, ceases altogether at the minimum temperature of 3° C. and at a maximum temperature of 32 -- 33° C. At 33-34° C. the mycelium is killed. The optimum temperature is 27 -- 28° C. When this same organism is cultured in the soil temperature tanks, mycelial growth is inhibited at 32° C. and the mycelium is killed at 36° C. The optimum temperature of such cultural conditions is 24° C. When grown in the Altmann incubator, G. saubinetii reaches its maximum rate of spore production at a temperature of 23 -- 32° C. In the development of seedling blight of wheat resulting from G. saubinetii infection, the experiments show but little infection at 12° C., none at all at 8° C., most severe at 24 -- 28° C., very light again at 32° C., and none at 36° C. The following tables clearly illustrate the relation of soil temperature to the production of seedling blight of wheat as compared with that of corn.

Table 1. The Relation of soil temperature to the production of seedling blight of wheat and corn by Gibberella saubinetii.

WHEAT

Soil temp. ° C.	Average percentage germination		Average number of blighted plants		Total reduction in stand due to Fusarium blight
	Check	Inoculated	Check	Inoculated	
8	56	60	0	0	0
12	77	65	0	1	3
16	81	45	0	2	7
20	88	46	0	3	8
24	80	46	0	3	7
28	69	38	0*	3	7
32	65	48	0*	2	4
36	53	47	0	0	0

CORN

8	0	0	0	0	6
12	50	0	0	0	3
16	83	33	1	2	5
20	91	83	0	3	3
24	91	100	0	2**	0
28	100	83	0	0	0
32	83	100	0	0	0
36	91	91	0	0	0

* 3 plants in the checks at 28° C. and 2 plants in the checks at 32° C. showed typical Fusarium blight probably due to infected seed.

** An average of two plants per pot showed definite root lesions at 24° C., but none of the plants were blighted.

An examination of the table will show that the low temperatures are more favorable for the development of the wheat plant when grown in blight-infested soil, whereas the disease is most severe at relatively high temperatures. The exact reverse is the case with corn, for here we find the infection light at 2o - 24° C., none at all at 24° C., and most severe at a temperature between 20 and 8° C.

Relation of Soil Temperature to the Development of Wheat and Corn.

Germination of wheat is normal at a temperature of 8 - 24° C., the rate of germination increasing up to 32° C., at which point wheat plants are out of the soil within 48 hours. In the case of the higher temperatures, the development of the shoot begins before that of the roots, while the reverse is true when germination conditions are maintained at low temperatures. The best development of roots and tops of winter wheat obtains when the temperature is held at 16° C. until heading time. The best development of roots and tops of winter wheat obtains when the temperature is held at 16° C. until heading time. The best development of the roots and tops of spring wheat occurs at a maintained temperature of 16-20° C., while growth is inhibited at 36° C. The germination of corn is normal at temperatures ranging from 20--32° C. At lower temperatures the development of the epicotyl is seriously checked. The rate of germination for corn increases up to a temperature of 32° C. At the higher temperatures the seedlings are out of the soil within 40 hours. The shoot develops first at high temperature and the roots later. At low temperatures there is a marked retardation in the development of the shoot, accompanied by vigorous root growth. The maximum rate of root growth of corn obtains at 24° C. and of tops at 32° C. during the first two months of plant growth. These experiments were all conducted under greenhouse conditions and have not been checked against similar experiments in the field.

218-B. RUST INVESTIGATIONS.

(Dr. H. B. Humphrey, Pathologist in Charge.)

BARBERRY ERADICATION CAMPAIGN

(F. E. Kempton, Pathologist in Charge.)

Assistant State leaders are requested to send a brief report of their activities each month, not to exceed one page of double-spaced typewriting. These reports should show the work accomplished during the month and should contain anything of special interest to the whole campaign. In order that they may be published in the final number of the Cereal Courier for each month, they should be mailed on the last day of the month and should be marked "Courier Notes."

Barberry Survey in 1919.

Barberries located and removed during the period from July 1 to December 31, 1919, and during the entire year 1919, listed by States, are as follows:

State	July 1 to Dec. 31.		Total for year.	
	Found	Removed.	Found	Removed.
Colorado	2,381	1,940	17,832	17,816
Illinois	28,494	30,167	45,370	39,879
Indiana	4,346	10,095	10,192	11,962
Iowa	31,168	37,853	78,095	66,271
Michigan	93,174	55,616	100,147	58,590
Minnesota	41,452	39,220	55,441	50,541
Montana	460	312	9,039	8,916
Nebraska	12,173	23,170	44,004	37,335
North Dakota	475	475	1,171	1,171
Ohio	172,734	106,443	188,867	107,327
South Dakota	3,582	7,998	7,862	16,740
Wisconsin	1,566,361	1,562,181	1,588,494	1,565,798
Wyoming	815	326	3,764	326
Totals,	1,957,615	1,875,796	2,247,143	2,102,763

State leaders are requested to send corrections, if the totals here given do not agree with their figures.

COLORADO

Agricultural College, Ft. Collins, (J. G. Leach).

No field work was done during March. From the beginning of the campaign to April 1, 1920, 19,677 bushes were located and 16,908 removed. Form letters, bulletins, and display cards have been placed in the hands of all teachers and county agents. Maps of areas covered during the campaign have been prepared and sent to the Washington Office.

ILLINOIS

State Entomology Building, Urbana (L. R. Tehon).

During March, 897 bushes of the common and purple-leafed barberries were reported eradicated. These were distributed among 60 plantings in 21 counties. Following is a summary of the work of the office:

Letters received	82
Letters sent out	74
Individual form letters on eradication of particular barberries	263
General form-letters (publicity)	501
Barberry post cards	280
Barberry posters	338
Bulletin No. 1058	639
Yearbook Separate No. 796	5
Reprints of barberry and rust plates from Yearbook	34
Copies of State notice regarding eradication of the barberry	24
Newspaper articles	6

Individual form letters include a series of follow-up letters to owners of barberry plantings who have been reluctant about removing their bushes. General form letters were sent to 390 of the most prominent farmers in the State, now actively connected with the operation of farm bureaus, either as officers or directors. Farmers' Bulletin 1058 has also been sent to each of these men.

Posters are being sent to various parts of the State. We are planning to reach the high schools first. In addition to the posters, copies of Farmers' Bulletin 1058 have been sent to each high school. Many of the high schools now have Separate No. 796 from the 1918 yearbook, the plate illustrating the life history of rust in connection with the barberry, and the plate for use in distinguishing the various kinds of rust.

Newspaper articles have for the most part consisted of summaries of the work done in individual counties. These have been prepared in the form of news articles and sent to the leading newspaper of the particular county under discussion.

INDIANA

Purdue University Agricultural Experiment Station, La Fayette. (F. J. Pipal).

Except for writing letters and sending out literature, practically nothing has been done in 1920 in the way of survey or removing bushes.

March report blanks show 4 bushes found and 51 bushes reported removed. This brings the total found in original survey to 83,742 and the total removed to 80,239.

Beginning about April 1, we expect to start checking up the 79 cases we still have left on our records. The new ruling issued by the State Department of Conservation extended the time limit for the removal of these plantings to April 15. Probably a considerable number will remove their bushes rather than defy the ruling and carry the matter into court. After these 79 cases are checked, which will require about three weeks, we expect to start checking all plantings we have on record, to make sure that no sprouts are being allowed to grow. Wherever roots are found to be sprouting, they will be immediately removed. This work will keep us busy to June 30, and some will be left to carry on after July 1.

Indiana has completed rural surveys in 12 counties; 2,703 bushes were found on 131 rural properties.

IOWA

Iowa State College, Ames, (Leighton L. Rhodes.)

The number of barberries reported from the beginning of the campaign to March 20 is 196,419 found and 145,154 removed. From July 1 to December 31, 1919, 31,168 barberries were located and 37,853 removed.

During January, most of the time was spent in the office preparing the annual report of barberry eradication work in Iowa in 1919, and in completing the records of the office. Particular efforts were made to obtain complete lists of the newspapers, libraries, county superintendents, and county agents of the State in order to request their cooperation in the campaign. Owing to unfavorable weather, little field work was done. From January 22 to 26 reports were completed on the location of barberry bushes at Boone, Iowa.

During February, further work was done on the directory of newspapers, libraries, etc. The weather was unfavorable for field survey.

The plan of the field work for the coming season is (1) to survey towns of 100 or over to insure the complete eradication of bushes reported dug and to distribute publicity material to various agencies such as county agents, elevators, schools, libraries, etc., and (2), as soon as the first survey is completed, to conduct a rural survey by auto of certain selected areas.

MICHIGAN

Michigan Agricultural College, East Lansing, (W. F. Reddy).

From June 1 to December 31, 1919, a total of 4,988 properties were located which had 96,891 barberries on them. Of these, 773 were wild areas having a total of 11,881 bushes. Several other wild areas were located which will be carefully surveyed later. These are estimated to contain at least 100,000 bushes.

A general survey of the State has been made which shows the largest areas of barberries. It is now planned to select a unit, such as a county, and make a careful survey revisiting old locations and checking for sprouts and seedlings. It is our intention to take all of the squad in to the county and work from some central point, encouraging as much actual removing of the bushes as possible, and recording definite information on all bushes not removed.

Form letters, bulletins and posters have been distributed during March.

MINNESOTA

College of Agriculture, University Farm, St. Paul (Mark A. McCarty).

Three counties were completely surveyed last year, and 7 were approximately 75 per cent surveyed, so that a total of 140 townships are completely surveyed farm to farm. Thirty-nine areas of escaped barberries with 36,685 bushes were located. A total of 10,000 posters, 8,000 bulletins, and numerous form letters have been sent out. The March resurvey blank shows 10 properties surveyed with 25 bushes in the found columns. The totals now are, 66,244 bushes found, 48,486 bushes removed.

Plans for the future include rechecking of towns already covered, soliciting and seeking information in these towns of possible barberries in the community, followed by a rural survey in the southwestern portion of State, continuing eastward and northward until the State is covered. There is yet some question as to the desirability of covering the forested area in the northern part of the State in the rural survey.

Form letters have been distributed as follows:

Botany departments of various State schools and colleges,,..	15
County agents and agricultural instructors.....	225
High school superintendents and school principals.....	800
Managers and operators of Minnesota creameries.....	900
Presidents and cashiers of Minnesota banks.....	1,600
Managers of Minnesota elevators.....	1,800

Posters, life cycle cards, bulletins, etc., were sent with these letters, the material sent depending on the recipient. To county agents and high school men, Separate No. 796, a supply of Farmers' Bulletin 1058, rust plates, life cycle cards, and posters were sent. To elevators, banks, etc., consider-

ably less material was mailed.

I have just completed sending out 21,000 postcard questionnaires to members of farm bureaus through county agents of 63 counties. In this way, it is hoped to locate a part of the barberries growing on farms.

Weather conditions are very bad at present in this section for field work. I have been out two days to points near the city and have been able to find a few more bushes.

MONTANA

Montana State College of Agriculture and Mechanics Arts, Bozeman (R. B. Streets).

All plantings found in 1918 were rechecked in 1919 and reported in the summary for that year, as they had not been previously reported to the Washington Office. No field work has been possible since that report summarizing last summer's work, so the figures given at that time are the latest available. Those show 9,039 bushes located and 8,916 removed. Only one escaped barberry bush has been located so far in this State, and that was a seedling on the college campus. Since January 1, 1920, 500 posters, 1,000 circulars, and 500 State circulars have been distributed.

Future plans include a complete check of plantings found, for eradication of sprouts; resurvey of certain areas where barberries were abundant; collection of data on prevalence and spread of rust during entire season, Farm to farm scouting of the entire area of Montana is neither desirable nor practicable. The method of scouting now in use in Montana has been proved by careful tests and rechecking to be as accurate as a farm-to-farm survey of the entire region. Strictly dry-land regions and regions very recently settled have proved to be entirely free from barberry. These regions are scouted rapidly. The older settlements along water-courses are checked carefully, and highly developed agricultural regions with extensive irrigation systems are surveyed farm to farm.

NEBRASKA

College of Agriculture of the University of Nebraska, Lincoln (James H. Faris).

Four counties were completely surveyed farm to farm last year and seven were partly surveyed, so that a total of 130 townships were covered. Approximately 31,000 miles of road have been traveled by auto, 75,922 barberries have been located, and 69,253 removed. So far, only four areas of escaped barberries, containing 14 bushes, have been located.

Since January 1, 1920, 5,000 posters, 5,000 State circulars, 23,000 bulletins, and 23,000 form letters have been sent out.

Future plans are to check plantings located last year, then make a house to house canvass in the section where spring wheat is the most important, leaving the less important spring wheat regions until later. This will mean

a survey of northeast Nebraska first and will make it possible to clean up the barberries in a strip along the river where the danger of the plants escaping from cultivation is greatest.

NORTH DAKOTA

North Dakota Agricultural College, Agricultural College
(Geo. C. Mayoue).

Farm-to-farm survey work during 1919 shows 3½ counties of 177 townships surveyed, and 13,275 miles of road traveled by auto. The totals for the State since the campaign began are approximately 17,000 found and 17,000 removed. Every bush is removed as it is found. No escaped bushes have been found. Observations the first year did not show any berries on the bushes located, and the bushes are said not to mature seeds. What are Minnesota's observations along the North Dakota border? If this is true, it will eliminate one source of trouble in that locality.)--F.E.K.) Further observations are needed.

Since December 15, 1919, Farmers' Bulletins 1058, Yearbook Separate 796, posters, life-cycle cards, and circular letters have been mailed to county superintendents of schools, teachers, county agents, club leaders, elevatormen, depot agents, postmasters, and bankers. The total number of copies mailed are as follows: F. B. No. 1058, 4,856; Y. B. Separate 796, 400; posters 9,567; circular letters, 16,077; and life-cycle cards, 8,000. Demonstrations and lectures have been given at 16 farmers' institutes and 25 schools, 4 teachers' institutes, 8 farmers' clubs, and the Tri-State Grain Growers' Convention. Twenty-nine Barberry Eradication Clubs have been organized among the school children of North Dakota. Thirty-seven barberry plantings have been located through publicity work, and 938 letters have been received at this office asking for information about the barberry.

OHIO

College of Agriculture of Ohio State University, Columbus
(J. W. Baringer).

No farm-to-farm survey was attempted in 1919. The plan adopted was to scout towns and cities, but 8,500 miles of road were surveyed in the travels from town to town. A total of 188,893 bushes were located and 138,061 removed. Ten escaped areas with a total of 2,509 bushes were found. The original survey blank for work done for March shows 4 plantings of 67 bushes located, 29 plantings of 674 bushes removed.

Future plans are to eradicate several plantings of escaped barberries. A thorough farm-to-farm scouting program will be adopted in counties in the western part of the State adjacent to the Indiana State boundary, proceeding eastward as funds permit. There will be a reinspection of removed locations as the farm-to-farm work progresses. The publicity and educational campaigns are being continued as during last year.

SOUTH DAKOTA

South Dakota State College of Agriculture and Mechanic Arts, Brookings (H. C. Gilbert).

In the farm-to-farm survey of 1919, 12 townships were covered, and 60 areas of rural barberries were located, containing 5,373 bushes.

During January, reports of the field season of 1919 were prepared and notes and files in the office completed and checked over. No original survey or resurvey work was done.

During February, material was prepared for a State bulletin and for inclusion in a Federal report. Some publicity material for the season of 1920 was prepared. One trip of a few days to talk to the Corn and Grain Growers' Convention was made. No original survey or resurvey work was done.

During March, a large amount of publicity material was prepared and sent out. Preparations were made for field work as soon as the weather permits. No original survey or resurvey work was done.

WISCONSIN

College of Agriculture of the University of Wisconsin, Madison

In farm-to-farm survey of 1919, only 3 townships were covered. In a survey of cities and towns about 8,000 miles of roads were surveyed. Twenty-five areas of escaped barberries containing 1,657,394 bushes have been found since the campaign began. A total of 13,400 barberry bulletins and form letters have been sent out.

Future plans are to clean up all escapes, to completely clean up an area and enlarge this area, county by county, as fast as possible until the entire State is clean.

WYOMING.

College of Agriculture, University of Wyoming, Laramie.

Wright L. Hess, who has been assistant State leader, has recently resigned that he may spend the required time during the summer on his homestead at Shawnee, Wyo. During the past year, 3,764 barberry bushes have been located and 326 removed. Wyoming is the only State of the thirteen not having a law under which barberry eradication can be enforced. Future plans have not been entirely formulated.

LEAF RUST INVESTIGATIONS.

(In cooperation with Purdue University Agricultural Experiment Station)
H. S. Jackson and E. B. Mains. The winter work on leaf rusts is being rapidly brought to a close and the spring work is developing with a rush. The uredinial culture studies with strains of leaf rust of wheat which we now have on hand will soon be finished and the results will shortly be summarized for comparison with field results and as a basis for future cultures.

A taxonomic study of the collections and cultures accumulated during the past season has resulted in distinguishing a number of forms, especially upon the wild grasses. The correlation of morphological characters with cultural results already has greatly facilitated the work with heteroecious cultures. The determination of whether these distinctions are specific or racial will depend upon further cultures and taxonomic study. This work also has resulted in clearing up several puzzling problems regarding related species on grasses.

The studies of uredinial and telial germinations have been discontinued temporarily, waiting for the development of better constant temperature apparatus. It is our plan to continue these studies in the early summer and late fall.

Various improvements in methods and equipment have been undertaken during the winter. Two large muslin-covered booths have been erected in the greenhouse for use while making cultures. A series of Wardian chambers, cooled by a spray, have been erected upon a greenhouse bench to take care of stock cultures of leaf rust. A cheap substitute for bell jars, which promises to be very satisfactory, has been found in the modification of the old-fashioned plant covers used for forcing early vegetables.

Our collection of species of grasses and possible secial hosts has been greatly increased. Seed of grasses received from Professor Davis, Mr. Leonard and Mr. Gray have been grown in the greenhouse, adding a number of species new to our list. Seed of a number of species of Ranunculaceae and Boraginaceae also have been received from various collectors and botanical gardens and is being propagated as rapidly as possible. The perennials for use in connection with the heteroecious cultures have been brought in from the pits in which they were overwintered and are now in good condition for telial sowing.

The heteroecious culture work is rapidly increasing and for a time will occupy the major attention of the laboratory. Tests of 254 cultures of wintered telial material on grains and various grass hosts have been made. Of these, 106 collections have germinated so far and for the most part have been sown. The results from these sowings are just appearing.

The outlook for the wheat nursery is not as promising this year, as many of the varieties were badly winterkilled. Sowings of spring wheats and barleys have not yet been made on account of the bad weather. These will be made as soon as the ground can be prepared.

Miss Evelyn Allison has been engaged in summarizing the results of the past season's work. Miss Florence Smith has finished the microscopic examination of the cultural material, and is now testing the germination of wintered telial material. E. Mardfin has been engaged in developing new methods of culture and supervising the construction of new equipment and, with the assistance of R. O. Cole, a junior assistant at Purdue University, has been carrying on the culture studies with the leaf rusts of wheat.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION).

Vol. 12. May 10, 1920. No. 9.
Personnel (May 1-10) and Field Station (April 16-30) Issue.

PERSONNEL ITEMS

Carleton R. Ball, Cerealist in Charge, was called to Lapeer, Mich., May 6, by the death of his father. From this point he will start on a field trip to the various experiment stations in the Central States, probably including North and South Dakota, Minnesota, Wisconsin, Iowa, Illinois, Indiana, Ohio, and Michigan.

Charles E. Chambliss returned to Washington May 10 from Crowley, La., where he has been for the past two weeks in connection with cooperative experiments with rice on the Crowley Rice Station. He reports that seeding on the station is completed, with the exception of the nursery, but that germination was delayed by dry weather until late in April, when about 2½ inches of rain fell. Following this germination was very rapid. In Acadia Parish only about one-third of the rice acreage had been sown up to March 8. In the Mississippi River district in Louisiana indications are that a considerably larger acreage of rice will be sown than in former years.

Ira C. Hoffman, assistant plant pathologist in corn root-and-stalk-rot investigations, resigned April 30 to become assistant professor of horticulture in Purdue University, La Fayette, Ind.

Miss Helen Johann, assistant plant pathologist, who is associated with Dr. Johnson in investigations of imperfect and sac fungi at Madison, Wis., is being transferred temporarily to the Office of Fiber Plant Investigations to investigate diseases of fiber flax, effective May 16.

C. H. Kyle left Washington [illegible] for Brooksville, Gainesville, and other points in Florida, and Darlington and Florence, S. C., to supervise the detasseling and hand pollination of corn in connection with his breeding experiments.

John H. Rushmeier has been appointed unskilled laborer on the Cheyenne Experiment Farm, Cheyenne, Wyo., effective May 1.

W. H. Weston, jr., who returned to Washington May 1 from two years of investigations of downy mildews of corn in the Philippines, reports that this disease is generally distributed throughout the Philippine Islands, and that there is evidence in some regions at least that it has been present for more than forty years. It is terribly destructive to maize. Although its severity in any one region is dependent on attendant conditions, the aggregate loss each year to the $8,820,000 corn crop of the Philippines is a very heavy one.

The causal organism, Sclerospora philippinensis, is closely related to the several downy mildews attacking corn, sugar cane, and other grasses in Java, India, Formosa, Australia, and other oriental countries. Inoculation experiments show that this Philippine Sclerospora, although most common and most destructive on maize, will also infect teosinte, sorghum, and sugar cane, as well as Saccharum spontaneum and Miscanthus japonicus, wild grasses very widely distributed throughout the Orient.

The life history of the fungus has been investigated at length and shows some unusual and interesting features. Preventive measures have been devised and have proved successful in keeping the disease under control under the most difficult conditions.

The study of this disease in the Philippines gives every reason to believe that it would prove very destructive if allowed to gain a foothold in the southern part of our own corn belt, and would probably persist also in the more northern corn States in spite of their severe winters.

J. G. Willier returned May 3 from Piketon, Ohio, where he had been assisting Mr. Hartley in planting experimental plats of corn and he reports heavy rains in Ohio and Indiana, which have seriously delayed the preparation of land for planting.

VISITORS

Mark D. Bohen, representative of the Russell Miller Milling Company at Syracuse, N. Y., called at the office May 10 to discuss wheat experiments, particularly with reference to the milling quality of wheat varieties.

James T. Jardine, for the past several years in charge of grazing experiments in the Forest Service, and recently elected Director of the Oregon Agricultural Experiment Station, conferred with project leaders May 10 with reference to the cooperative cereal and cereal disease experiments in Oregon. Mr. Jardine will assume his new duties about June 1.

Dr. F. R. Jones, pathologist in charge of forage-crop disease investigations (Office of Cotton, Truck, and Forage-Crop Disease Investigations), was an office visitor on May 3. Doctor Jones, who is stationed at Madison, Wis., is at present engaged in the investigation of pea root rot. He has recently completed work on alfalfa crown wart and a publication is to follow.

Senor Alberto Larco of Trujillo, Peru, was a visitor at the office May 6. Senor Larco is a large owner of rice and sugar lands in the lowlands of Peru who is also interested in obtaining varieties of cereals suitable for growing at high elevations. He is a graduate of Cornell University and will visit that and other agricultural institutions in the United States before his return to Peru.

Dr. L. H. Pammel, Professor of Botany at Iowa State College and Botanist of the Iowa Agricultural Experiment Station, was a visitor at the office May 1.

Dr. Kolpin Ravn, the Danish scientist, was a visitor at the Office at various times from April 29 to May 8. It will be remembered that Dr. Ravn discovered the presence of stripe rust, Puccinia glumarum, in California during a visit to this country in 1915. This was the first report of this disease in America, though it was later found at various locations in Oregon and other western States.

PUBLICATIONS

A manuscript entitled, "Injury to Seed Wheat Resulting from Drying after Disinfection with Formaldehyde", by Dr. Annie May Hurd, was transmitted to the Chief of the Bureau on May 7 for publication as a professional paper in the series of Departmental Bulletins.

A manuscript entitled "Proso Millet," by John H. Martin, was transmitted to the Chief of the Bureau on May 7 for publication as a Farmers' Bulletin.

The following papers were omitted from the list of publications in the Cereal Courier of March 31, 1920, pages 54 - 58. If there were other omissions, mention of the publications will be made on receipt of information regarding them by the Office. The papers omitted are:

"Quarantines against 'Flag Smut' and 'Take-all'", by W. W. Mackie, published in Mo. Bul. Dept. Agr. State Cal., vol. 8, no. 8, p. 456-460, Aug., 1919.

"The Relations of Certain Ear Characters to Yield in Corn," by H. Howard Biggar, in Jour. Amer. Soc. Agron., vol. 11, no. 6, p. 230-234, Sept. [illegible]

CONDITIONS OF 1920 CROPS.

MAY CROP REPORT.

The report of crop conditions on May 1, according to a statement of the Crop Reporting Board of the Bureau of Crop Estimates issued May 8, shows an estimated acreage of winter wheat to be harvested of 34,165,000 acres, or 4,605,000 acres (11.9 per cent) less than the acreage shwn last fall. This is slightly more than the 10-year average percentage of abandonment, which is 11.2. The estimated acreage to be harvested is 15,740,000 acres (31.5 per cent), less than the acreage harvested a year ago, when there was practically no abandonment from winter injury.

The condition of winter wheat on May 1 was 79.1, pcompared with 100.5 a year ago and a 10-year average of 87.1 per cent on May 1. The condition reported indicates a yield of about 14.2 bushels per acre if the season is an average one. At this rate the acreage to be harvested would produce 484,647,000 bushels, or slightly less than two-thirds of the estimated winter wheat crop of last year, 14.2 per cent less than that of 1918, and 17.4 per cent less than that of 1917.

Of the important winter wheat States, the abandonment was greatest in Illinois, 18 per cent; Ohio and Kansas, 16 per cent; and Indiana and Oklahoma, 13 per cent. The abandonment in Montana was 22 per cent, and In Washington 20 per cent, but the acreage in these States is much less than in those just mentioned. The condition of the Kansas crop is estimated as 80 per cent, as compared with a 10-year average of 83 and the condition of 103 a year ago. Conditions now indicate a yield of 95,790,000 bushels in this State. In Nebraska, the condition is estimated as 88 per cent as compared with a 10-year average of 86 per cent. This condition indicates a yield of 47,585,000 bushels. The condition is lowest in Ohio, Indiana, and Illinois, being 68, 65, and 69 per cent, respectively.

The average condition of rye on May 1 was 85.1 per cent, as compared with 95.4 per cent a year ago and a 10-year average condition of 90.5 per cent. The condition forecasts a production of 79,789,000 bushels compared with a final estimate of 88,478,000 bushels a year ago and 91,041,000 bushels two years ago.

The backwardness of the season is well shown by the figures on spring plowing and planting. On May 1, it is estimated that only 60.1 per cent of the spring plowing in the United States was completed, compared with 72.7 per cent a year ago and a 10-year average of 71.4 per cent. Only 50.2 per cent of the spring planting was completed May 1, compared with 61 per cent a year ago and a 10-year average of 59 per cent.

WEATHER BUREAU SUMMARY FOR WEEK ENDING MAY 4.

The Weather Bureau's National Weather and Crop Bulletin for the week ending May 4 says:

"The week was too cold and cloudy for the proper advance of vegetation in practically all central and northern districts and the soil was so wet and cold that farm work could make but little progress. The temperature and sunshine conditions were more favorable in the Southern States, and there was ample soil moisture, except from western Texas and Oklahoma westward. It was cool, dry, and windy on the Pacific coast during much of the week. The conditions continued unfavorable for stock in the central and upper Rocky Mountain and upper Great Plains States and there was further loss of both young and old stock.

"The moderately warm weather for the season in much of the South during the past week was favorable for the growth of corn, and the generally light rainfall in the central and western Gulf States permitted cultivation. The color of the plants is improving in the lower Mississippi Valley. Considerable progress was made in planting in the central trans-Mississippi States, although the soil continues too wet in some localities. Planting progressed northward over the central Great Plains to extreme southern Nebraska at about the average date. In the central districts east of the Mississippi, however, continued cold weather and frequent rains prevented much progress in preparation of soil and planting of corn, especially in the Ohio Valley. Planting made fairly good progress in the Atlantic coast sections, becoming general during the week as far north as Virginia. The cold, dry, and windy weather was unfavorable for germination in the middle and south Pacific coast sections, but the warmer weather was favorable in the far Southwest.

"There was a general and rather decided improvement in winter wheat during the week in much of the Atlantic coast area and also in the central Great Plains; elsewhere the crop continued to improve, but rather slowly on account of insufficient warmth and sunshine. The weather during the week was very favorable for winter wheat in Kansas and satisfactory progress was made in that State; the stalks are stooling well in the western portion and beginning to head in extreme southern counties. The recent rains in Kansas and Oklahoma were beneficial for the winter grain crops, but they are suffering for moisture in most of Texas, where wheat is heading on a short straw. Some grains that are coming into head in California are also suffering from deficient moisture. While winter wheat is growing slowly in the Northwestern States, it is mostly in good condition in that area; it is stooling well and is in fair to good condition in Montana.

"Winter oats made satisfactory advance in the Southern States from eastern Texas eastward, but it continues too dry in central and western Texas. This crop is ripening in Florida and harvest has begun in that State. Rye and barley showed some improvement during the week in nearly all sections, but the advance was mostly slow on account of continued unseasonably low temperature.

"The weather continued unfavorable in the spring wheat belt, the week being cold, cloudy, and rainy, preventing satisfactory progress in the preparation of seed beds and sowing of grain. Fairly good progress was made in seeding in some localities in the southern portion of the belt, and much spring wheat was sown in Montana, but, as a rule, little of this work was possible. In an average season, seeding is general by this date to the northern limits of the belt, while during the present season very little spring wheat has been sown in some of the heavier producing localities, particularly in the Red River Valley.

"Oat seeding, also, was still further delayed by the unfavorable weather conditions, especially in central and northern districts from the Mississippi Valley eastward. Both oats and barley, however, are reported in fair to good condition in the central Great Plains, although growth is slow. Oats on lowlands in Indiana were badly washed by floods. The week was favorable for rice seeding in Arkansas, and the rains at the close of the preceding week were very beneficial to this crop in Louisiana."

CONDITION OF HARD WINTER WHEAT.

Milling and Grain News, in its issue of May 5, says:

"That the movement of new crop wheat will be two weeks to a month later than normal is the belief now expressed by close observers of crop conditions in the Southwest and generally over the winter wheat belt. The plant has been greatly benefited by additional moisture, including a heavy precipitation in western Kansas, but unseasonably cool temperatures are retarding growth. Lack of sunshine and warmth is a common complaint, and developments of the past week were unfavorable in this respect. Advices from the country, however, indicate that the plant is in a healthy condition, and will respond readily to sunshine and generally higher temperatures.

"'Splendit, soaking rains, averaging from one to two inches, fell over the northern half of Kansas the latter part of the week, removing the last effects of last winter's drouth and storing much needed moisture in the soil,' says the weekly weather and crop bulletin of the Kansas State Department of Agriculture. 'The southern half was not quite so well favored, but the week's total in that section ranged from a half to an inch, except in a few of the southwestern counties, which are still rather dry. The week was abnormally cool and deficient in sunshine. Freezing weather occurred several mornings in the western counties. The damage was light, however, due to the backward state of vegetation, which is practically two weeks behind the season.

"'The weather was almost ideal for wheat, which is stooling in fine style and making a satisfactory growth, though it will be benefited by sunshine and warmth. In the south-central portion, especially from Sedgwick and Reno Counties south, high winds did some damage the fore part of the week by blowing soil. This trouble was ended by the rain the latter part of the week. Wheat has already begun to joint in the southeastern counties and, with warm weather,

jointing will be general over the eastern half ~~of~~ in from 10 days to two weeks, and in the western half by the middle of May.'

"Wheat suffered further damage in Oklahoma, particularly on sandy soils, by high winds, and to an extent because of insufficient soil moisture. The condition of the crop in that State continued poor to fair, with only a relatively small acreage reporting good to excellent prospects. The recent rains will undoubtedly cause a marked improvement in the crop.

"The season is fully two weeks behind normal in Nebraska. Winter wheat is backward in the State, owing to cool temperatures, but rains have benefited the plant. Rainfall exceeded one inch in all portions of the State, and amounted to as much as two inches in scattered areas. Slight improvement in the condition of the wheat plant also is noted in Missouri, southeastern counties reporting a fair to good stand."

MODERN MILLER CROP REPORT.

The Modern Miller statement of May 8 regarding the crop outlook, is as follows:

"Winter wheat continues to make progress. Growth is slow on account of cool and wet weather, but plant roots have strengthened, insuring better development later. Condition is most favorable in the Southwest, where the wheat is commencing to head in some localities. Rain is needed in parts of Kansas and Oklahoma, but moisture generally is sufficient for the present. Fewer complaints of fly from soft winter states as weather retards their development.

"Considerable seeding has been completed in the spring wheat area, though there is much delay in North Dakota. Some early sown is up in portions of Minnesota and South Dakota. Decrease in Canadian acreage is indicated."

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North).

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). All of the earlier varieties of wheat, oats, rye, and barley are fully headed. Varieties of wheat are making excellent growth, although the stand of some is imperfect. Oats in the varietal experiments are making very good growth, but are not uniform, probably due to environmental conditions. Early-seeded

oats and wheat show indications of yields at least two thirds more than those sown late. All grain treated for smut by the dry formaldehyde method was damaged and stands on some plats are not good.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). The leaf rust of wheat is rapidly increasing in the wheat nursery and an epidemic will probably eventually be present. Leaf rust of rye is very plentiful in fields on the Station farm. No aecia have appeared on the barberries, though rusted straw is tied around them.

Small grains are growing very rapidly, but excessive rains and cold weather have delayed general farm work.

NORTH CAROLINA

State Experiment Station, West Raleigh, and Substations (G. M. Garren). No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). Winter rye is heading. The first variety to head was Abruzzes, C.I. No. 40, which reached this stage April 21. The winter wheat plats show good spring growth and are in excellent shape. Winter barley and oats are not so promising as the spring growth has been slow and the plats are very weedy.

In the detention nursery foreign importations of wheat, oats, and barley have been sown for observation. These are now emerging.

The precipitation for the month of April was 4.60 inches, which is 1 inch greater than the average for April during the past ten years. Freezing temperature occurred on several nights during April. The minimum temperature recorded was 29° and the maximum, 80°.

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love). After two weeks of good weather the latter part of March and early in April, the remainder of April has been cool, with many cloudy and rainy days. With the exception of the last few days, precipitation has not been great, but has occurred in frequent showers. Very little spring seeding has been accomplished and unless the land dries immediately, oat seeding will be very late.

In our experimental work we have succeeded in sowing most of our oat hybrids and some spring wheat hybrids and have sown part of the rod-row series. This was done on Monday and Tuesday, April 26 and 27. The ground is so wet that it is doubtful whether this work can be finished until the first week in May. It is planned to sow a rather extensive series of drill plats. In addition to the work at Ithaca, plats in which our best selections will be compared with some commercial strains are to be sown at seventeen places in the State. Two rod-row series, one in Jefferson and one in Lewis County, are also to be seeded. None of this outside seeding has yet been done. The cooperative correlation experiments between the Montana and Cornell University stations are to be continued and seed has been exchanged for the continuance of this work. During the month a considerable number of new wheat hybrids have been made on material growing in our greenhouse. A number of these were made with

the intention of trying to complete our series of species crosses.

Several of our best strains of oats and barley are to be multiplied on the College farm this year so that the quantity of seed sent to our cooperators may be larger than it has been.

INDIANA

Indiana Agricultural Experiment Station, LaFayette (George M. Hoffer). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). The month of April was unusually cold and wet, although the last week was fairly favorable. We complete to-day (April 29) our seeding of spring-sown grain, including 45 drill-width plots and some 3,000 rod rows. Besides the usual comparisons of varieties and selections of oats and barley, experiments on the effects of acclimatization, the effects of various seed treatments, the extent of economic variation within the varieties Red Rustproof and Kherson, and inheritance studies in oats are included.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

GREAT PLAINS AREA (South to North)

TEXAS

Amarillo Cereal Field Station, Amarillo (John F. Ross). No report.

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). April was a rather discouraging month, as it was dry, windy, and cold. The first date-of-seeding plats of sorghums were seeded on April 15. They emerged to irregular stands on April 29 and 30, the Dwarf milo on April 29 and the broomcorn Red Amber Sumac sorgos, and Sunrise kafir on April 30.

The second date-of-seeding plats were sown May 1. On this date, in addition to the five varieties just mentioned, Dawn kafir, Barchet kaoliang, and feterita were sown. Due to the rather dry condition of the soil, it was necessary to drill the seed rather deep.

The preparation of seed for the main sowings of grain sorghums and broomcorn about May 15 is about completed. A good rain is what is needed more than

anything else right now. The wind has not been so high during the latter part of April as earlier in the month.

The rainfall for April was 1.06 inches, which fell in seven showers varying from 0.01 to 0.53 inch. The 12-year average precipitation for April is 3.42 inches. The maximum temperature was 86° on April 29; the minimum, 29° on April 4.

The indications at present are for a large acreage of row crops, as much wheat was blown out.

KANSAS

Fort Hays Branch Station, Hays (A. F. Swanson). Favorable growing weather has prevailed during the entire month of April. Since April 15 two good rains have fallen. Wheat on the cereal project ranges from 8 to 10 inches in height, except on the plats sown late in the date-and-rate-of-seeding experiment. In this experiment, the wheat on the plats September 22 has jointed and in the September 30 seeding the first joint is forming.

Wheat throughout the country surrounding Hays is looking well except that most of it has been heavily pastured all winter and growth has been retarded. Most of the cattle were taken off about April 15. The acreage of spring grain seems to be small.

At present, the writer is classifying and thrashing individual sorghum heads for May sowing. About 1,000 heads will be included in the head-to-row nursery. "Sudan corn" is a new sorghum variety which recently originated in western Kansas and for which many claims are made. The variety will be thoroughly tested. Last year it compared favorably with feterita but only a few head rows were grown.

State Experiment Station, Manhattan (John H. Parker). The weather during the last half of March was warm and high winds occurred on the 18th, 19th, and 22nd, causing severe dust storms and some damage to wheat. During the last week in March soaking rains fell in eastern Kansas and broke a rather long drouth in some counties.

Unseasonably cold weather was general in Kansas during the first week of April, with a heavy snowfall on the 3d and 4th. During the second week, rain fell in many parts of the States and temperatures were generally below normal, fruit trees being severely damaged. During the third week, rain fell in many parts of the State and low temperatures prevailed on the 13th. During the fourth week, rains averaging from 1 to 3 inches fell over the northern half of Kansas. These rains stored much needed moisture in the soil which will be of benefit to crops during the growing season. Temperatures have been somewhat below normal.

At Manhattan, the maximum temperature was 82° F. on April 1 and 16 and the minimum temperature was 14° F. on April 5. A measurable amount of precipitation fell on ten days, the total for the month being 4.4 inches.

The oat and barley nurseries, which were severely damaged by wind on March 14, were reseeded on March 27 on clean land and came up in the normal time with fairly uniform stands. The series of oat varieties sent out by Dr. G. M. Reed for the smut experiment have made fair stands in spite of the damage from wind. A classification nursery of Burt oats was sown on April 12, consisting of about 1,000 kernels spaced 6 inches apart. A record of the type of each kernel has been made. These types include differences in color and other characters common in this variety. Several hundred lines of rye were sown on April 12 in an experiment on open and self pollination. The flax nursery, consisting of about 180 rows, was sown on April 17 When the 1920 yield figures are available, the 3-year average yield for the varieties grown will be figured and the best ones increased for trial in cooperative experiments with farmers in southeastern Kansas, where a small acreage of flax is grown each year. Spring wheat varieties in the rust nursery were sown on April 30. About 120 nursery rows of hybrids corn will be seeded in the nursery this week.

Professor Salmon has planted two or three date tests with corn at the Agronomy Farm and the varieties will be planted May 4 and 5. The snow, cold weather, and frost of April have damaged the oat varieties in plots at the Agronomy Farm to some extent. It is very evident that the varieties of the white or sativa group were much more severely injured than those of the red oat or sterilis group. Aurora, C.I. No. 831, was perhaps the least injured of the varieties of white oats, and Fulghum, Kansas No. 5179, showed much less injury than any of the other varieties of red oats.

Prof. L. E. Call is at Kent, Ohio, where he is recovering from typhoid fever. He is not expected to return to Manhattan until after the middle of May. Prof. S. C. Salmon visited the Hays and Colby Substations on April 19 and 20 to take notes on wheat varieties and inspect the crops work in progress at these stations. Mr. H. H. Laude, a graduate of Kansas Agricultural College in 1911, who was for a time in charge of the small grain nursery here and who has more recently been in charge of rice investigations at the Texas Agricultural Experiment Station, has been appointed to fill the vacancy caused by the resignation of Mr. C. C. Cunningham. Mr. Laude will take charge of the cooperative experiments with farmers in this State on or about June 1.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). The last half of the month of April was very unfavorable for spring work. A 3-day blizzard started April 17 and ended April 19. The snowfall was very heavy and as a result no field work was possible from April 17 to April 28. Not all of the snow had melted on May 1. The temperatures during this period were very low for this time of the year. The ground was frozen nearly every night and both fall-sown and spring-sown cereals made practically no growth. The emergence of spring grains sown the latter part of March was very slow and uneven. The tips of the leaves of both spring and winter cereals appear dead as the result of the freezing temperatures. The last three days of the month were very warm and as a result rapid growth is now taking place. The cereals sown in plats the latter part of March have emerged to excellent stands in nearly every case.

Seeding of spring cereals in field and nursery was completed during thol last three days of the month. Ten additional plats of oats and wheat varieties were seeded in addition to those previously reported. The total number of plats of fall and spring cereals now growing at Akron is practically 370. While the stands in some of the plats of fall grain was considerably reduced through winterkilling and blowing out, the plants which have emerged are growing well.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). During April, more unpleasant weather was experienced than in any previous month of the year. There has been a great deal of snow, two of the storms covering the precipitation gages and making it impossible to obtain data. No field work has been done during the month and it will be at least a week before tillage operations will begin.

~~Sheridan Field~~

There has been untold loss of livestock, Cattle, especially calves, were buried in snow drifts almost everywhere. The early grass had caused them to wander from the feeding grounds and when the storm came it was impossible to rescue them.

Sheridan Field Station, Sheridan (Leroy D. Willey). No report.

SOUTH DAKOTA

Bellefourche, South Dakota (A. D. Ellison). Under date of April 28, 1920, A. D. Ellison, formerly in charge of cereal experiments on the Bellefourche Experiment Farm and now county agent of Butte Co., S. Dak., writes:

"Very few farmers in this section have succeeded in getting their cereal crops sown to date. Weather conditions have been so severe, with frequent rain and snow storms, that practically no field work of importance has been done. It seems that the month of May will be a busy one in this section, providing weather conditions permit. Cattle and sheep men in this section have sustained big losses on account of the long, cold winter. It has been next to impossible to keep enough hay on hand to keep cattle from starving. Grass on the range is just beginning to grow and, from present indications, may help the cattle and sheep men in a week or two."

Highmore Substation, Highmore (E. S. McFadden). No report.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzel). Field operations have been delayed by rain extending over a period of eight or ten days. However, the fields are in good condition for seeding at this time. The seeding of the wheat rust nursery and of a few plats for flax wilt and canker experiments has been completed.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.). The last half of April has been generally cold and cloudy, though there has been very little rain.

Apparently all fall-sown wheat has winterkilled. Alfalfa has made no spring growth and probably the greater part if not all is killed.

Spring wheat varieties were sown April 19, and oats and barley varieties on April 27. The second seeding in the date-of-seeding and tillage ex-

periments with flax was made May 1.

The maximum temperature for the last half of April was 60° recorded on April 17 and 29; minimum, 18°, recorded April 27 and 28. Precipitation, 0.54 inch, making the total precipitation for the month of April only 0.58 inch.

Dickinson Substation (Ralph W. Smith). The spring has been cold and backward during the past month. There have been many days when enough snow or rain has fallen to interfere with field work, but the total precipitation for the month was only 0.78 inch, which is a little more than half the normal precipitation for the month.

Seeding is still in progress, considerable grain being sown by the farmers on disked grain stubble without plowing. At the Dickinson Substation the varietal and rotation plats and the increase plats have been sown. The seeding of the nursery now in progress is interrupted by a snowstorm this morning (May 2 1).

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). The condition of winter wheat sown on fallowed ground is much better to-day than a week ago. Wheat has made considerable growth the past week and is looking much greener. Plants that would pull up easily a week ago are sending out new roots and showing green above ground. However, there will be some winterkilling, especially in the nursery, which was sown very late. The next report should give some definite information in regard to the wheat sown in plats.

Kharkov selection, C.I. No. 1583-30, shows more green than any other variety in replicate plats, which was also true of this variety last fall. In an earlier statement, it was reported as doubtful whether the wheat would come through the drifted soil in the plats receiving the heavier applications of straw in the straw-mulch experiments, but it now appears that there may be a stand. The wheat sown with the furrow drill looks a little better than that sown with the ordinary drill in the furrow-drill and straw-mulch experiments.

Wheat sown in stubble looks very well and volunteer wheat in stubble, where there is a stand, looks exceptionally good.

The April precipitation was 5.37 inches, which exceeds all previous April records for twenty-two years by 2.52 inches. The total precipitation so far this year has been 7.12 inches, which is 2.78 inches less than the total amount of precipitation during the entire year 1919. It is snowing to-day (May 1), the snow being driven by a cold northwest wind. The soil is soaked for at least 3 or 4 feet.

No spring field work has been done yet on account of the frequent snows and rains keeping the fields too wet. Less than a week of good weather would dry the fields so that work could be started. Temperatures the past month has been considerable below normal.

Director Linfield of the Montana Agricultural Experiment Station visited here April 22.

WESTERN BASIN AND COAST AREAS
(South to North and West)

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). During April the precipitation amounted to 2.13 inches, 0.51 inch of which came in 12 inches of snow on the 14th. The rainfall this month is 0.79 inch above the normal. The temperature readings were below normal, with a minimum of 9° and a maximum of 76°.

Spring work in this section is delayed considerably because of the heavy rainfall during March and April, and the low temperatures have allowed very slow growth of the crops. Considering both crops and spring work, the season, when compared with the average, is over two weeks late.

On the station, all barley, oat, and wheat varieties have been sown in the varietal experiments; 454 rows of spring wheat selections have been added to the nursery; and peas, oats, barley, and alfalfa have been seeded in the rotation experiments. Preparation is now being made for sowing corn, beans, and potatoes in the varietal and corn and potatoes in the rotation experiments.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Harney Branch Station, Burns (Obil Shattuck). No report.

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman Co. Branch Station, Moro (D. E. Stephens). No report.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). (April 17). The weather has been unsettled during April, with some rain, and as a result we have not been able to do any field work. Last year we were seeding at this time, and if the weather stays good we will probably be able to get part of the rice in this month.

The water situation for irrigation has not improved. A reduced acreage is probably the only solution to the problem, but the question at present is, "Who is going to reduce?"

(May 2). Preparation of the land for spring seeding began on April 20. The soil worked well and a good seedbed was obtained for all experiments. Rice in the fertilizer and cultural experiments was sown April 23; in the varietal experiments, on April 25; in the irrigation experiments, April 26;

the small increase plats April 27; and the nursery, April 28 and 30 and May 1.

A few large increase plats still remain to be sown. We are starting to irrigate to-day. Water was turned into the canal April 29. Some of the farmers are using water, but most of them are still seeding.

Agricultural Experiment Station, Berkeley (W. W. Mackie). No report.

Plant Introduction Station, Chico (V. H. Florell). The small grains are developing normally at the Gardens. Occasional commercial fields in the vicinity of Chico are beginning to show the effects of the dry weather while farther out in the valley and especially on the lighter lands on the west side of the river rain is needed badly.

Practically all varieties of barley are now fully headed, as are also ~~the~~ most of the Australian wheat varieties. The greater part of the wheats in the classification nursery have begun to head, while a considerable portion of them are fully headed. All varieties of flax have been in full blossom for several days.

Several crosses have been made among the earliest varieties of wheat. Considerable crossing will be done within the next week or ten days.

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CEREAL COURIER

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION)

Vol. 12. May 20, 1920. No. 10.
Personnel (May 11920) and Field Station (May 1-15) Issue.

PERSONNEL ITEMS

A report has just reached the Departm nt (May 26) that Dr. Kolpen Ravn, Government Pathologist of Denmark, who was visiting the United States for a study of quarantine regulations covering potato and other truck crops, and who recently spent several days at the Department, has died suddenly in New Jersey. No details of his death are known at this time.

C. R. Ball returned on May 17 after visiting the experiment stations at Brookings, S. Dak., Fargo, N. Dak., St. Paul, Minn., and Madison, Wisc., for the purpose of conferring with station officials regarding cooperative experiments and inspecting investigations under way. In spite of the late spring, field experiments at all points visited are progressing satisfactorily and everything points to a successful year.

John R. Fitzsimmons, of Colorado, has been reappointed field assistant in barberry eradication, effective June 1, to assist in the barberry eradication campaign in Colorado, in which work he was engaged for several months last summer.

H. S. Garrison left Washington May 12 for Norfolk, Va., and Belhaven and Terra Ceia, N. C. to supervise the planting of experimental plats of corn. He returned to the Office May 19.

J. M. Hammerly was in Loudoun County, Va., May 17 to 20, supervising the planting of experimental plats of corn at Bluemont and other points.

Dr. A. G. Johnson and D. S. Reddy left May 16 for Bloomington, Illinois, to assist Mr. Holbert in the planning of the extensive series of experimental plats in connection with corn root-rot investigations.

Emile Mardfin, who has been assisting Dr. H. S. Jackson in the investigation of leaf rust at the Purdue University Agricultural Experiment Station at La Fayette, has resigned effective May 31 to enter other work.

B. E. Rothgeb left Washington May 11 for Kansas City, Mo., to attend a conference of representatives of the Bureau of Markets to consider the formulation of market grades for grain sorghums. The conference was held May 13 to 17 and tentative standards were agreed upon which will be tested in the various Grain Supervision offices before being finally established and promulgated. Mr. Rothgeb also attended a conference of Bureau of Market representatives in Chicago May 18 and 19, returning to Washington May 20.

F. D. Richey returned to the Office May 15 from a 3-week's trip to Illinois, Arkansas, and Missouri, where he supervised the planting of experimental plats of corn.

Gus Wiebe returned to his college studies at the University of Idaho May 9, his temporary appointment to assist in the seeding of spring cereals at the Aberdeen Substation having expired and the work having been completed.

PUBLICATIONS.

Page proof of a paper entitled "Rust In Seed Wheat, and Its Relation to Seedling Infection," by C. W. Hungerford, which is to appear in the June 15 issue of the Journal of Agricultural Research, was read May 17.

A paper entitled "Natural Wheat-rye Hybrids of 1918," by Clyde E. Leighty, was published in the Journal of Heredity, vol. 11, no. 3, pages 129-136, March, 1920.

AMENDMENTS TO THE FISCAL REGULATIONS.

The following amendments to the fiscal regulations have been received:

MEMORANDUM NO. 309

May 4, 1920.

Sections (h) and (u) of paragraph 83 of the Fiscal Regulations are hereby amended, effective February 14, 1920, to read:

83. EXPENSES NOT REIMBURSABLE IN ADDITION TO PER DIEM; EXPENSES REIMBURSABLE.---Employees authorized to receive per diem allowances in lieu of subsistence will not be reimbursed, in addition, for--

* * * *

(h) Telegrams reserving hotel accommodations.

* * * *

but, in addition to the per diem allowance, may be reimbursed for expenses actually and necessarily incurred for--

* * * *

(u) Other expenses of transportation, including telegrams reserving Pullman accommodations:
Provided, That payment of any fee herein mentioned in any State in which payment of such fee is prohibited by law will not be reimbursed. (See Appendix F.)

E. T. Meredith, Secretary.

MEMORANDUM NO. 310. May 1, 1920.

Effective May 1, 1920, section (c) of paragraph 86 of the Fiscal Regulations is amended to read as follows:

(c) An employee assigned to temporary duty in one locality may be allowed usual subsistence expenses and street-car fare on official business during the entire period of such employment, not to exceed 60 days unless otherwise specifically authorized by the Secretary in advance; but temporary absence from the designated locality during any part of such period shall serve neither to prolong the same nor to create any additional period. The time limit prescribed in this section will not apply to employees of the department traveling in the field and not assigned to temporary headquarters.

E. T. Meredith, Secretary.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). The early varieties of wheat in the rust nursery are heading. Leaf rust continues to increase in the leaf rust nursery. There is comparatively little leaf rust of wheat in the Station plats, but leaf rust of rye is very plentiful. Leaf rust of barley occurs on several plats, Helminthosporium stripe disease of barley is very plentiful, and a Helminthosporium spot on oats is present in small amounts.

Two pustules of rust have been found on barberries, both from Minnesota telia. Tennessee telia have caused no infection. Rhamnus caroliniana covers the hills north of Knoxville, but so far only two pustules, on widely separated trees, have been found, though oat leaf rust was very plentiful last fall. No oat leaf rust has been found this spring.

NORTH CAROLINA

State Experiment Station, West Raleigh, and Substations (G. M. Garren). Nothing of special importance has occurred since last winter either in the cereal experiments on the Experiment Station or in the conditions of the small grain crop in general throughout the State. The extreme dry weather prevailing throughout the entire fall of last year caused very late seeding of the small grain crop by the farmers in the wheat-growing sections of the State. The warm, variable winter weather that followed caused much winter-killing, particularly in winter oats sown late in the fall. On the Piedmont Branch Station farm several acres of winter oats sown late in the fall were killed outright and the land had to be resown with spring oats. The weather conditions of the entire spring and early summer, however, have been unusually favorable to the development of the small grains. At present, the prospects for at least a normal crop, particularly of wheat, are excellent. Harvesting will begin in about twenty days and if weather conditions remain favorable until harvest there will be some interesting facts to report on the wheat and other small grain crops of the State.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). No report.

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love). No report.

INDIANA

Indiana Agricultural Experiment Station, LaFayette (H. S. Jackson and E. B. Mains). The heavy rains and cold weather of April and the first part of May have seriously delayed the sowing of spring grains for leaf-rust studies. These sowings were finally made May 6, about a month later than would have been the case in a normal year. It is doubtful if many of these will produce mature grain, but it is hoped that they will at least serve to supply rust notes to supplement those of the previous season.

A local grass garden has been started in connection with our leaf rust research for the purpose of supplying seed for greenhouse studies and to furnish notes concerning the action of the various grass rusts under field conditions. About 66 collections of annual grasses, representing 33 species, have been sown. Perennials which have been grown in the greenhouse the past winter are now being transplanted. It is planned to have about 154 species represented in the grass garden this season and to increase this number gradually from year to year until most of the important rust-bearing species are represented.

During the past month the heteroecious rust cultures have been continued with especially good results. A number of species and races have been cultured, giving some new connections and confirming results previously obtained with others. This work is still being carried on, although teliospore germination is not as vigorous as it was two weeks ago. Up to date, telia from various grass hosts have given infection upon species of the following genera: Anemone, Anchusa, Aquilegia, Clematis, Impatiens, Macrocalyx, Nothoscordum, Ranunculus, and Thalictrum. Aeciospores from a number of these aecia have been sown back upon their grass hosts and cultures thus started will be used this summer for the study of races and strains.

Arrangements have been made, through the Office of Cereal Investigations, with various collaborators in the south to take notes and to collect specimens from sowings made last fall. A number of collections have already been received from these workers and up to May 17 the resistant varieties have shown little or no rust. The susceptible varieties, however, have shown but slight infection at the various stations, so that the resistant varieties have hardly received a fair test.

Cultures with the leaf rust of wheat are being continued, tests being made on additional varieties of wheat. Some very interesting results have recently been obtained pointing to the presence of fairly distinct strains. In consequence, more cultures are being made this spring than were originally planned.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). The first half of May has been fairly seasonable in Missouri, but farm work over the State as a whole is still almost a month behind. The condition of wheat is slowly

improving. The acreage of oats is considerably lower than was expected on account of unfavorable conditions in early spring. Corn planting is about half completed, being most forward in the south and southwest, and most backward in the north and northeast.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). (May 10). Seeding of spring cereals was greatly delayed by continued rains and cool weather. All were finally sown except the varietal plats of oats. The seeding of these was so long delayed that it was decided to use the land for other crops as the results from an experiment sown at so late a date would have been misleading. The land will be used for corn and soy beans for silage, these crops being removed in time to sow winter wheat next fall. The oat breeding nursery and the oat classification nursery were sown about May 1.

Winter wheat looks better than a year ago, and the prospects are for a 40-bushel crop. The plats have been fertilized with phosphate and sown to biennial white sweet clover which is now emerging to a fine stand.

Corn planting is well under way and should be completed this week if the weather continues favorable.

GREAT PLAINS AREA (South to North)

TEXAS

Amarillo Cereal Field Station, Amarillo (John F. Ross). No report.

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). (May 15). The first week of May was warm and dry, while the second week has been wet and cool.

The sorghums in the second date-of-seeding plats emerged to fair stands on May 9 and 10. Because of the rain it has been impossible to sow the third date-of-seeding plats on the scheduled date. They will be seeded next week as soon as the soil is in condition. All the varietal and rate plats will be seeded as soon as we can get in the fields. The first and second date plats were cultivated May 13.

The maximum temperature for the month to date was 91° on May 2, and the minimum was 43° on May 15. The precipitation for the month to date has been 2.41 inches, most of which fell in two rains, one on May 11 and the other on May 14 and 15. The soil is thoroughly wet now and the moisture should be enough for a few weeks to come.

KANSAS

Fort Hays Branch Station, Hays (A. F. Swanson). Since May 1, 1.5 inches of rain has fallen in the form of gentle showers which thoroughly saturated the ground. All small grains are making good growth. The wheat is now in the boot and oats and barley have made sufficient growth to cover the ground.

Reports from various points in northwestern Kansas indicate favorable crop conditions. Farmers are busy planting row crops.

The sorghum ground was listed May 10 and 11. This ground was plowed last fall and left rough to prevent soil blowing. The grain sorghums will be sown about May 20 with a 2-row planter which will follow in the rows made by a double-row lister. Experimental corn was planted May 13 and included sixteen varieties.

Representative wheat growers met in a conference at Hutchinson, Kans., May 3, and decided on 70 cents an hour as the wages for the coming harvest.

Approximately 75 rural high-school students from several different counties have visited the Hays Branch Experiment Station since May 1. Considerable interest was displayed in the various lines of experimental work.

State Experiment Station, Manhattan (John H. Parker). No report.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). The first few days of the month were warm and pleasant. Since May 10, the weather has been cold, windy, and disagreeable, and at present the ground is covered with about 3 inches of snow. The leaves have just begun to appear on the trees, and as a whole the season is about as backward as the spring of 1919. The farmers are having great difficulty in completing their spring work. Since the latter part of March, the fields have been covered with snow the greater part of the time, and, when not so covered, have usually been too wet to permit farming operations. Temperature and moisture conditions have been unfavorable for spring work but have been very favorable for fall-sown grain. Winter wheat and rye and spring grains sown the latter part of March are in excellent condition. The acreage of spring cereals in this section of Colorado is possibly much short of what it would have been had the weather conditions been more favorable for spring seeding.

Spring work on Akron Field Station is practically completed, aside from the planting of corn and the sorghums, which is not usually done before May 15 to 20. All spring cereals on both field and nursery projects have emerged, and as a whole the stands are very satisfactory. The stand data on all of the field plats have been taken. In the fall wheat varietal experiment, Kharkov, C.I. No. 4207, shows the highest percentage of winter survival, while Kanred shows but 1 per cent less, the percentages of survival being 69.8 and 68.8, respectively. In the rate-and-date experiment with Kanred, the highest percentage of winter survival resulted from the seeding of September 4. The lowest survival is shown in the seedings of October 1. The seed sown on this date was treated with formaldehyde, which may account for the low percentage of survival. The other four seedings in the experiment were made with untreated seed.

The first planting in the date-of-seeding experiment with corn was made May 10. Eight varieties are included in this experiment.

Mr. Jos. F. Brandon and Mrs. Brandon arrived at Akron Field Station May 11. They made the trip from Woodward, Okla., by automobile. Mr. Brandon

has been appointed Superintendent of Akron Field Station to succeed Mr. Oliver J. Grace. Mr. Grace is one of the oldest employees, in length of service, in the Office of Dry Land Agriculture. He has been Superintendent of Akron Field Station for more than ten years and has had an important part in the development of cropping practices in this section of Colorado. Mr. Grace is leaving the Government service to engage in farming, having purchased a farm near Scottsbluff, Nebr.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). During April there was a total of 3.98 inches of precipitation and during the first fifteen days of May there was 1.95 inches most of which was in the form of snow. At present the weather is clear and it is hoped that within the next few days spring seeding may be done.

Sheridan Field Station, Sheridan (R. S. Towle). No report.

SOUTH DAKOTA

Bellefourche, South Dakota (A. D. Ellison). No report.

Highmore Substation, Highmore (E. S. McFadden). No report.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzel). No report.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, jr.). During the first half of May there has been much disagreeable, windy weather with little rainfall, moderate temperatures, and no frost.

Flax sown in the date-of-seeding experiments April 15 and 23 and wheat varietal plats sown April 19 emerged May 3. Oats and barley varietal plats sown April 27 emerged May 7. Flax date-of-seeding plats sown May 1 emerged May 10, and the spring wheat nursery and the flax date-of-seeding rows on diseased land sown May 5 emerged May 12. It is interesting to note that susceptible and wilt-resistant strains sown on diseased land have all emerged satisfactorily without showing any signs of wilt so far.

Flax varietal plats, rate-of-seeding experiments, and increase fiber flax were sown May 10 and 11.

Maximum temperature for the first half of May was 80°, recorded May 10; minimum, 34°, recorded May 13; precipitation, 1 inch. Average wind velocity for the half month was 7.8 miles per hour. On May 15, from 8 a.m. to 4 p.m., the wind velocity averaged 18.8 miles per hour.

Dickinson Substation, Dickinson (Ralph W. Smith). Thus far, the spring has been rather cold and backward. The mean temperature for April was about 9° below normal. May opened with a snow and rain totaling about two-thirds of an inch of moisture. This was followed by warm, sunny weather that produced prompt and fairly uniform germination of cereals in plats and nursery. The past week has been very windy and crops on light soil in the vicinity of

the Substation have suffered from soil blowing.

All cereal varieties in plats and nursery have emerged except headrows. and flax plats. The latter were sown within the past week.

The winter wheat nursery of about 600 rows was totally winterkilled, winter wheat and rye in varietal plats were almost entirely killed. The failure of these crops was due partly to the very dry condition of the soil in the fall which prevented uniform germination and also to the early freezing of the ground last October, which prevented further growth.

The seeding of grain crops in the vicinity is still in progress, but is nearly completed. Considerable corn and millet will be grown.

Clayton Russell, the newly appointed County Agent for Golden Valley County, visited the Substation during the week while enroute to Beach, N. Dak., to begin his duties.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). No report.

WESTERN BASIN AND COAST AREAS
(South to North and West).

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). All sowings of spring oats, wheats, and barleys in the varietal experiments emerged with good stands during the first part of May; and the barley, oats, and peas sown in the rotations have also emerged. Potatoes have just been planted in the rotations and varietal experiments and the planting of corn and beans will follow soon.

During the past week no field work was possible on the station because of several showers which occurred, and the soil is still too wet for plowing. Crops on the station are in excellent condition, due to the unusual amount of precipitation, but spring work is now nearly two weeks late with prospects of further delay.

Unless damaged by frost, the yields of alfalfa and all grains, including fall wheat, will be far above normal. Cool nights followed by moderately warm days are allowing the winter wheat to tiller freely.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Harney Branch Station, Burns (Obil Shattuck). No report.

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman Co. Branch Station, Moro (D. E. Stephens). No report.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). No report.

Plant Introduction Station, Chico (V. H. Florell). Most of the wheat varieties are now past the blossoming stage and the work in hybridization for the season was completed during the past week. A few of the earliest varieties have begun to ripen. The Hard Federation (C.I. No. 4733) increase field on the station is beginning to turn brown and will ripen soon.

A considerable number of barley varieties and a few varieties of oats have begun to ripen. The Fulghum oats looks most promising.

Prof. W. W. Mackie of Berkeley was a visitor at the Gardens on May 14. Disease notes were taken on all strains and varieties of barley. The Rhyncosporium was the most abundant disease, although the infection is considerably lighter than usual. Traces of net blotch, spot blotch, and stripe diseases were observed in a few instances.

Messrs. Packard and Johnston of the Bureau of Entomology, with headquarters at Sacramento, were visitors during the first week of the month.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION)

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Vol. 12. May 31, 1920. No. 11.
Personnel (May 21-31) and Project Issue.

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PERSONNEL ITEMS

Miss Ruth F. Allen, scientific assistant in plant pathology, who has been on leave without pay since April 1, has been restored to the rolls, effective June 1, and will continue investigations of the cereal rusts under the direction of Prof. W. W. Mackie in cooperation with the California Agricultural Experiment Station.

Carleton R. Ball, cerealist in charge, left Washington May 31 for Columbus, Ohio, where he will confer with extension and experiment station officials regarding the conduct of the barberry eradication campaign in Ohio. From there he will go to LaFayette, Ind., Bloomington, Ill., Ames, Iowa, Lincoln, Nebr., and Manhattan, Kans., to inspect cooperative experiments and to consult with experiment station and extension officials.

Henry Burns, laborer at the Cheyenne Field Station, resigned May 19 and has been succeeded by Theodore Ballard, effective May 24.

J. Allen Clark, assistant agronomist in charge of western wheat investigations, left Washington May 31 for Manhattan, Kans., to study the extensive winter wheat nursery there. He will then visit Hays, Kans., Berkeley, and Chico, Cal., Corvallis and Moro, Oreg., and other stations in the western United States in the interests of wheat investigations. He will attend the conference of western agronomists at Berkeley and Davis, Cal., June 10-12.

C. P. Hartley, physiologist in charge of corn investigations, returned to Washington May 29 from Piketon, Ohio, where he has been for the past month supervising experimental plantings of corn.

Dr. H. B. Humphrey and Mr. Leukel planted the Arlington corn disease plat May 25. The soil was in excellent condition and there is every reason to believe that the germination will be prompt and subsequent growth satisfactory. The corn was furnished by Mr. Holbert.

Carl Kurtzweil, who has been on leave without pay since April 1, has been restored to the rolls, effective June 1, and will continue investigations of rusts and fusarium rots in cooperation with the Tennessee Agricultural Experiment Station.

Louis Y. Leonard, assistant pathologist in stem-rust investigations in California, has resigned to become assistant leader of Boys and Girls Clubs in Sacramento County.

Moses M. Levine, who has been on leave without pay since April 1, has been restored to the rolls, effective June 1, and will continue to assist Dr. Stakman in greenhouse studies of rust epidemiology at University Farm, St. Paul, Minn.

Emile Mardfin, whose resignation effective May 31 was noted in the last issue of the Courier, is to take a month's rest and then expects to accept a position as executive secretary of the Civic Club of New York City.

John H. Martin, scientific assistant in western wheat investigations, left Washington May 21 for Manhattan, Kans., to study the extensive winter wheat breeding nursery there. From Manhattan he will go to Hays, Kans., Chico, Cal., Corvallis and Moro, Oreg., and other cooperating stations, returning to Washington about September 1. He will attend the conference of western agronomists at Berkeley and Davis, Cal., June 10 to 12.

L. S. Meyer writes from Rhinebeck, N. Y., under date of May 24, that he has never seen the season so backward as it is this year, and that there is also a serious labor shortage so that farm operations are greatly delayed.

Dr. Geo. M. Reed found two heads of loose smut on Arlington Farm, on May 21. This is the first time the disease has been reported from this immediate vicinity.

Leighton L. Rhodes, assistant State leader of the barberry eradication campaign in Iowa, has resigned effective June 7 to accept a position with the Iowa Builders' Supply Company, Cedar Rapids, Iowa.

Miss Jessie P. Rose, who has been on leave without pay since April 1, has been restored to the rolls effective June 1, and will again assist Professor Owens in stripe rust investigations in cooperation with the Oregon Agricultural Experiment Station.

Victor F. Tapke, assistant pathologist in cereal smut investigations, left Washington May 29 for La Fayette, Ind., and various points in Indiana and Illinois, to confer with experiment station officials and inspect loose smut experiments. He will also inspect the flag smut experiments at Granite City, Ill.

VISITORS

Prof. H. C. Ramsower, director of extension in Ohio, was an Office visitor May 26, when he discussed pathologic extension work in Ohio.

Director C. G. Woodbury, of Purdue University Agricultural Experiment Station, was an Office visitor May 25.

PUBLICATIONS

A paper entitled "The Effect of Time of Irrigation on Kernel Development of Barley," by Harry V. Harlan and Stephen Anthony, was submitted May 24 for publication in the Journal of Agricultural Research. This is the third of a series of studies on the growth and development of the barley kernel.

PROJECT REPORTS

218-B.. RUST INVESTIGATIONS

(Dr. H. B. Humphrey, Pathologist in Charge.)

BARBERRY ERADICATION CAMPAIGN

(F. E. Kempton, Pathologist in Charge).

State leaders are reminded that reports for the month should be mailed promptly on the last day of the month. They will then be received in time for inclusion in the issue bearing that date.

COLORADO

Agricultural College, Ft. Collins, (J. G. Leach). No report.

ILLINOIS

State Entomology Building, Urbana (L. R. Tehon). (April report). Barberry eradication in Illinois has progressed steadily during the month of April. The continuous rainy weather has been such as to prevent much active field work. This has made it impossible for us to check to a considerable extent the findings of the past year's scouting. We have, however, been engaged in sending information throughout the State and in securing the removal of bushes hitherto found but not removed.

Mimeographed letters sent out from this office have included letters to agricultural students in the University of Illinois, letters to banks for public display, letters to editors of all the newspapers in the State, a catchy form letter sent out to property owners who were known to have barberries but had not acknowledged their removal, and a rather striking form letter sent to all persons who had removed their bushes for the purpose of warning them against sprouts.

Publicity has included articles of particularly local interest sent to individual papers, articles of general interest sent to all newspapers, special articles for State agricultural magazines, and a talk illustrated with the barberry film before the Agricultural Club of the University.

Arrangements have been made for the installation of a permanent demonstration in the State Natural History Museum at Springfield. It is believed that this demonstration will be particularly useful, as many people visit the museum and the placing of the demonstration in a prominent position will make an impression on them which is bound to result in increasing interest in barberry eradication. Interest in eradication undoubtedly is increasing in the State. Twenty requests for particular information have been received

during the month. These requests come from farmers, business men, students, and teachers.

During April, 5,005 bushes have been removed. These bushes were distributed among 154 properties, the properties being located in 34 counties.

(May report.) With the cessation of the long period of rainy weather extending through April and early May, barberry eradication in Illinois has gone forward rapidly. During the entire month, our office has continued the sending out of publicity material as during the previous months.

The State leader has taken two trips during the month, one in the early part of May through the territory directly south of the permanent station at Urbana. Here it was found that practically all barberries had been removed and that no sprouts had appeared. During the last days of the month, the State Leader made a rather extensive trip through the northern portion of the State, checking up on last year's work. He found that approximately 99 per cent of the barberries found last year had already been removed. There were no signs of infection in the northern part of the State on the few barberries still remaining.

Only a single report of infected barberry has reached this office during the month of May, that one coming from Plainfield in Will County.

During May, reports have come to us of the eradication of 1,851 barberry bushes. These bushes were removed from 85 different properties, the properties being distributed among 25 counties. The largest number of properties and the second largest number of bushes removed were in Will County (14 properties, 380 bushes). The largest number of bushes removed was in Peoria (8 properties, 396 bushes).

Mr. Glenn of the State Department of Agriculture spoke before the Illinois Grain Dealers Association on May 11 in the interest of barberry eradication. The prospect of cooperation with grain dealers in spreading information appears brighter as a result.

The splendid weather during the latter part of May and which bids fair to continue throughout the coming month gives us hopes that our total of 21,559 bushes removed by resurvey will be largely augmented during the coming month.

INDIANA

Purdue University Agricultural Experiment Station, La Fayette (F. J. Pipal). No report.

IOWA

Iowa State College, Ames (Leighton L. Rhodes). During April, the educational and publicity campaign of barberry eradication in Iowa has consisted of sending feature articles, short stories, and a resume of the progress of the campaign to every daily and country newspaper in Iowa. This method was chosen because of the wide poster publicity in 1919. The use of posters

will probably be resumed in 1921.

During the month, the resurvey was begun. Out of 24 plantings in one county, 6 were found to be sprouting. The resurvey indicates that from 10 to 25 per cent of the former bushes located may be sprouting. A check is to be made to resurvey all reported locations, to kill the sprouts.

During May, a resurvey of the wild areas of the State was attempted. The wild area at Kelley was checked and surveyed. Many new bushes and sprouts were found and eradicated. The wild area in Clinton County near Calamus was also resurveyed. In 1919, 11,000 wild bushes were reported in this area. All bushes and sprouts located to date have been eradicated. A resurvey of as many more wild areas as possible will be attempted before June 30.

MICHIGAN

Michigan Agricultural College, East Lansing (W. F. Reddy).

No report.

MINNESOTA

College of Agriculture, University Farm, St. Paul (Mark A. McCarty).

No report.

MONTANA

Montana State College of Agriculture and Mechanics Arts, Bozeman , R. B. Streets).

No report.

NEBRASKA

College of Agriculture of the University of Nebraska, Lincoln (James A. Faris).

Follow-up work on plants located during the past two years indicates that over 25 per cent of the barberries located in the country and towns have been eradicated. In a few places eradication has been improperly done by cutting bushes off or by breaking roots off near the surface of the ground, and these have sprouted. With very few exceptions, these young sprouts have been rusted. The first rust was found May 11. During previous years of the barberry campaign, rusted barberry has been hard to find in the vicinity of Lincoln and south and east of this city. This year, however, the barberry in this vicinity is badly rusted. In some cases the young buds and petioles are covered with the aecia. In a few cases portions of the stems of the young sprouts have been rusted. We have had considerable rain during the past spring, but this has also been true of the preceding two seasons. This spring has differed from the other two in that it has been much colder and without even an occasional hot day until after May 15. There may be some relation between this continued cool, wet weather and the amount of rust prevalent on

the barberry. If this type of weather has been prevalent elsewhere in Kansas, Missouri, southern Illinois, and other places where barberry has been found lightly rusted in previous years, it would be interesting to know the situation now.

NORTH DAKOTA

North Dakota Agricultural College, Agricultural College (Geo. C. Mayoue).

(April). During April, scouting for the common barberry bushes commenced on the 9th and continued during the favorable weather of the month, a total of 14 days. The work of scouting was carried on by the assistant State leader alone, except at Valley City, where one temporary assistant and two men furnished by the city assisted in the work. The bushes located had merely started their spring growth. They were in most cases secluded in clumps of different kinds of shrubbery and in hedges. Presumably, that is the reason those bushes were not located in the original surveys made during the past two years.

A brief report of the bushes found is as follows:

Town.	Percentage covered.	Plantings	Bushes	Sprouts	Total Found and removed.
Fargo	40	8	15	7	15
Valley City	100	4	12	5	12
Wahpeton	65	2	11	0	11
		14	38	12	38

During the month of May, most of the time was spent in field work. Twelve towns were rescouted and seventeen farms scouted for the first time. Six plantings of 69 bushes were located in three of the towns and one planting of three bushes was located in the country. The first moderate rust infection on the barberry was found May 23 on a planting of three bushes which was on a farm four miles east of Page, N. D. The second rust infection, which was light, was found on ten bushes, May 28, at Pillsbury, Barnes County. While in the field, instructions and demonstrations concerning the barberry and its identification were given at meetings of farmers and townspeople.

Eight barberry eradication clubs were organized in rural schools.

OHIO

College of Agriculture of Ohio State University, Columbus (J. W. Baringer).

(April). Two large plantings of escaped barberries were eradicated in the early part of April. Farmers were generous with assistance in accomplishing this task. According to our records, four large plantings of escaped barberries located last year are still standing in Ohio.

Later, several nurseries were inspected with a view to locating common barberries which had escaped notice heretofore. The discovery of 3,150 bushes, in three locations, resulted from the inspection; 3,000 of this number were removed before May 1.

Considerable effort was exerted in urging property owners to remove harmful barberries through eradication publicity and personal and circular letters. Letters were mailed to every man in Ohio who had failed to remove his barberries to date. As a result of our correspondence, 246 plantings containing 7,131 bushes, were removed. In all, 10,131 common barberries were removed from Ohio during April.

The first infected barberry of the season was discovered at Columbus, Ohio, on April 22.

(May). In the early part of May, numerous circular and personal letters were mailed to Ohio residents who had been reluctant in the matter of removing common barberries. As a result, 164 plantings containing 2,108 bushes, were removed.

Later, an area was inspected near Mingo, Ohio, from which escaped barberries were removed late last fall. The object of the inspection was to ascertain the thoroughness of the removal operations. A few barberries were found in this area which had evidently escaped notice. These were infected and were promptly removed.

Nearly half of Greene County was covered by automobile in a farm-to-farm survey in the latter part of May. Five plantings of common barberries were discovered in the rural districts thus covered. Four of these plantings numbered one bush each and the fifth was a planting of ten shrubs. One planting of sixty bushes was also found in a suburb of Xenia which had been overlooked in the original survey last year.

Infected barberries have been discovered in five different localities in central Ohio this spring.

SOUTH DAKOTA

South Dakota State College of Agriculture and Mechanics Arts, Brookings (H. C. Gilbert).

No report.

WISCONSIN

College of Agriculture of the University of Wisconsin, Madison.

No report.

WYOMING

College of Agriculture, University of Wyoming, Laramie.

No report.

STRIPE RUST INVESTIGATIONS

(C. E. Owens, Pathologist in Charge).

Before the end of April the weather turned dry and, although some infections of stripe rust on wheat in the nursery have been secured, conditions are not favorable for the spread of the disease. Unless we have more favorable weather for infection, we may not get as complete data on susceptibility of varieties as had been anticipated.

The land assigned for this work is of the "white land" type and poorly suited to wheat. Although the wheat in the nursery was, at the end of March, apparently recovering from the adverse conditions under which it started in November and December, nevertheless with the advent of dry weather it immediately began to appear stunted, due partly at least to the poor soil. Since rust usually grows more luxuriantly the more luxuriantly the growth of the host and vice versa, it seems probable that unless we have considerable more rain it will be difficult to induce a severe epiphytotic of rust in the nursery this season.

The work in the greenhouse is progressing as usual and there is nothing new to report.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION)

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Vol. 12. June 10, 1920. No. 12.
Personnel (June 1-10) and Field Station (May 16-31) Issue.

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PERSONNEL ITEMS

Carleton R. Ball, Cerealist in Charge, was given the honorary degree of Doctor of Science by the Iowa State College on June 10, in connection with the semi-centennial celebration of the opening of that institution.

Raymond Bulger of Brookings, S. Dak., a student at the South Dakota College of Agriculture, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in South Dakota.

Rueben G. Carlson of Chicago, Ill., a student at the University of Illinois, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Illinois.

Stanley P. Cecrle of Walkerton, Ind., a student at Purdue University, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Indiana.

Ruall O. Cole of La Fayette, Ind., a student at Purdue University, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Indiana.

Gilbert T. Gilbertson of Brookings, S. Dak., a student of the South Dakota College of Agriculture, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in South Dakota.

Dr. H. B. Humphrey left Washington June 3, for Lexington, Ky., La Fayette, Ind., Bloomington and Granite City, Ill., Minneapolis, Minn., and Madison, Wis., to confer with experiment station officials regarding the cooperative cereal disease experiments, and to inspect the take-all and flag smut experiments at Granite City, Ill.

Stanley F. Husted of Bloomington, Ill., a student at the University of Illinois, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Illinois.

Lynn D. Hutton of Egan, S. Dak., a graduate of the South Dakota Agricultural College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in South Dakota. Mr. Hutton was similarly employed from June to October, 1919.

Mark A. McCarty, Assistant pathologist and assistant State leader of the barberry eradication campaign in Minnesota, has resigned, effective June 21, to accept an instructorship in the University of Minnesota and do graduate work in that institution.

Forrest D. McCrea of Attica, Ind., a student at Purdue University, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Indiana. He was connected with the barberry campaign in Indiana from May to October, 1919.

Benjamin Koehler of Mishicot, Wis., formerly a student at Illinois Western University and who received his Bachelor's Degree from Lawrence University in 1917, has been appointed assistant pathologist, effective July 1, Mr. Koehler will assist Dr. A. G. Johnson in investigations of wheat scab and corn rot, in which work he was engaged from May to December, 1919. He is now pursuing graduate study at the University of Wisconsin, from which institution he will receive his Master's degree this month.

Dr. C. E. Leighty reports the finding of a head of rye containing loose smut. In this connection it should be stated that the note in the Cereal Courier of May 31 to the effect that Doctor Reed had found two heads of loose smut at Arlington, referred to the loose smut of rye.

Dr. G. M. Reed left Washington June 1, to inspect the smut experiments in Indiana and Illinois, including the flag smut experiments at Granite City, Ill.

Fred D. Richey left Washington June 8 for points in Louisiana, Arkansas, Missouri, and Illinois to obtain notes on experimental corn plats, and to hand-pollinate corn varieties.

Allen P. Willis, of Rosslyn, Va., a student at Swarthmore College, who has rendered considerable assistance in previous years in the cereal experiments at Arlington Farm, has beena appointed, effective June 9, to assist Dr. Leighty in his studies of the inheritance of characters in wheat.

VISITORS

Walter Farner of Langenthal, Switzerland, a member of the Swiss Tour for Economic Studies in North America, was an Office visitor June 10, when he consulted with the Acting Cerealist regarding the itinerary of the agricultural members of the Swiss Economic Tour during their stay in the United States. The party is made up of representatives of various industries in Switzerland, agriculture being represented by 12 members. On June 10 most of these men inspected the experiments which are being conducted at Arlington Farm. It is their plan to go from Washington to the Pacific Coast by way of Cincinnati, St. Louis, Kansas City, and Los Angeles, thence to San Francisco, Portland, and Seattle, returning to New York early in August by one of the northern routes. They expect to visit a number of the agricultural experiment stations and several of the important agricultural districts of the United States. The are specially interested in cereal production, dairying, and live-stock breeding. Mr. Schneider, a member of the Swiss Tour who is interested in textile manufactures, was an office visitor June 9, in connection with his interest in flax production.

F. J. Goold, a farmer and breeder of Blackwell, Okla., was an Office visitor June 10 in connection with the plans of the recently organized National Wheat Growers' Association, of which he is a member. On June 8, Mr. Goold and Mr. McMichael of Kingman, Kans., the latter the President of the Association, discussed their plans with a number of Department officials in a conference in the office of the Chief of the Bureau of Markets.

On June 3, a party of 9 county agent leaders who were in Washington for a conference, inspected the experiments in progress at Arlington Farm, including those with cereals, in which they showed much interest. The party consisted of Maurice A. Blake of New Jersey, Cecil W. Creel of Nevada, Arthur L. Deering of Maine, B. W. Ellis of Connecticut, Karl Knaus of Kansas, John W. Knorr of New Mexico, Murl McDonald of Iowa, Earl P. Robinson of New Hampshire, and Fred L. Williams of Idaho.

PUBLICATIONS

Galley proof of the papers entitled "Daily Development of Kernels of Hannchen Barley from Flowering to Maturity at Aberdeen, Idaho," by Dr. Harry V. Harlan, and "The Development of Barley Kernels in Normal and Clipped Spikes and the Limitations of Awnless and Hooded Varieties," by Dr. Harlan and Stephen Anthony, was read June 10. These papers are to appear in the August 2 issue of the Journal of Agricultural Research.

Reprints of a paper entitled "Philippine Downy Mildew of Maize," by Dr. William H. Weston, jr., which appeared in the Journal of Agricultural Research of May 1, have been received at the office. This paper contains 26 pages of text, 9 black and white plates, and 2 colored plates.

CONDITION OF 1920 CROPS.

The June crop report, issued by the Bureau of Crop Estimates on June 8, showed a slight improvement in winter wheat as compared with the report a month earlier, the estimated yield based on the June 1 condition being 503,996,000 bushels, an increase of more than 19,000,000 bushels as compared to the May report. The principal improvement was in the States of Oklahoma, Kansas, and Nebraska, there being little ~~xxx~~ change in the condition of the crop elsewhere. The percentage condition for the United States on June 1 was reported as 78.2, as compared with a 10-year average condition of 82 per cent.

The spring wheat acreage was estimated at 19,487,000 acres, a reduction of 16.5 per cent from the acreage sown a year ago. The reduction in acreage was general in the principal spring wheat States, being 15 per cent in Minnesota, 11 per cent in North Dakota, 19 per cent in South Dakota, and 22 per cent in Montana. Among the factors which caused this reduction in acreage are the shortage of labor, the cold, backward spring, and, particularly in western North Dakota and Montana, the poor condition of work stock. Washington shows a 4 per cent increase over the acreage of a year ago. The condition reported is 89.1 per cent, as compared with the 10-year average of 93.3. Based on the June 1 condition, the estimated yield of spring wheat is ~~277~~, 276,547,000 bushels, as compared with 209,351,000 bushels, the final estimate for 1919, and an average of 258,748,000 bushels for the 5 years from 1914 to 1918. The estimated total production of wheat is 781,000,000 bushels, as compared with 941,000,000 bushels last year, and an average production of 822,000,000 bushels for the 5 years from 1914 to 1918.

The estimated acreage sown to oats is 41,032,000 acres, a decrease of 3.2 per cent from that of a year ago. The June 1 condition is reported as 87.8 per cent, as compared with a 10-year average of 89.9, indicating a yield of 1,315,476,000 bushels, slightly larger than last year's crop, but about 100,000,000 bushels less than the average for the previous 5 years. The estimated barley sowing is 7,437,000 acres, an increase over last year of 0.2 per cent. The June 1 condition is 87.6 per cent, as compared with a 10-year average of 90.6. This indicates a yield of 185,108,000 bushels, nearly 20,000,000 bushels more than last year, and about 30,000,000 bushels less than the average for the five preceding years. The rye condition is 84.4 per cent as compared with a 10-year average of 89.2 per cent. On a reported acreage of 5,470,000 acres this indicates a yield of 80,006,000 bushels as compared with 88,478,000 a year ago and a 5-year average for 1914-1918 of 59,933,000 bushels.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). Mr. Mardfin of the cooperative cereal disease laboratory at La Fayette, Ind., was here May 25 and 26 to take notes on wheat leaf rust in the nursery. He reports infection ranging from less than 1 per cent on Crimean, Minnesota No. 832, to more than 100 per cent on several varieties.

Small grain is maturing very rapidly, but is two weeks later than last year.

NORTH CAROLINA

State Experiment Station, West Raleigh, and Substations (G. M. Garren). No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). The past month has been favorable to the development of wheat, rye, and barley, and indications point to good yields. Wheat has practically finished blooming. Nebraska Hybrid, C.I. No. 5147, was the first of the varieties in the field plats to flower, the others maturing May 20. The fall-sown spring wheats are the last to blossom.

Rye and barley are beginning to ripen. Rosen rye is the last variety grown here to flower, and the blooming period has been very irregular. Considerable natural crossing in Nakano Wase barleys is in evidence this year.

A few varieties of wheat show about 1 per cent of loose smut. Several heads of loose smut on rye have been found. Dr. Reed will later report in detail the smut situation on the farm.

Rainfall for the month of May has been low. Prior to May 16 the rainfall totalled 1.6 inches, but during the latter half of the month none was recorded. The maximum temperature for the month was 85°, and the minimum, 34°.

NEW YORK

Cornell University Experiment Station, Ithaca (W. T. Craig). Less rain has fallen in May than is usual here and it is very dry. Small grains and crops in general are in need of rain.

From June 30 to July 2 there is to be held here for the first time a summer Farmers' Week or Field Day, similar to the Farmers' Week held during the winter. The purpose of this field day is to give the farmers of the State an opportunity to inspect the experimental plats and the field work during the growing season.

Doctor Love left on May 28 for Chico, Cal., to take notes on and harvest the series of wheat hybrids being grown there in cooperation with the Cereal Office. He will visit en route the experiment stations at Manhattan, Kans., Fort Collins, Colo.; Logan, Utah; and Riverside, Cal.; and will attend the Western Agronomic Conference held at Berkeley, Cal., June 8-10. He will be accompanied on the trip by Major E. A. Southee of Australia, who is registered for a doctor's degree at Cornell with his major work in cereal breeding with Dr. Love, and who is taking this opportunity of becoming better acquainted with the agriculture of the country.

INDIANA

Indiana Agricultural Experiment Station, LaFayette (H. S. Jackson and E. B. Mains). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). Weather conditions in Missouri have been more favorable during the latter half of May than in any preceding two weeks' period this season. Wheat continues to improve. Corn planting is about completed over the southern half of the State. We will begin next week to inspect wheat in the southern part of the State for certification as seed.

The crops on the experimental field are in good condition, although many varieties of wheat show excessive winter injury. The wheat in the field is heading. We are now completing our hybridization work in the greenhouse.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

GREAT PLAINS AREA (South to North)

TEXAS

Amarillo Cereal Field Station, Amarillo (John F. Ross). No report.

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). Practically all of the sorghums were seeded during the last half of May. Due to the wet soil on May 15, the third date-of-seeding plats were not sown until May 17. The

plants emerged to good stands in 6 and 7 days. The kafir rate-of-seeding and method-of-spacing experiment was seeded on May 17 and emerged to a very good stand on May 22. On May 18 the broomcorn varietal experiment was seeded and on May 19 the broomcorn rate-of-seeding and method-of-spacing experiments, the broomcorn nursery, some broomcorn-cane hybrids, and the date-of-harvesting experiment of broomcorn were sown. The grain sorghum varietal plats were seeded on May 19 and the forage sorghum varietal plats on May 20. All of the seedings emerged to good stands in due time with the exceptions of several spots in certain plats where moles worked the rows. Seventeen moles have been trapped and the damage is now lessened.

The sorghum nursery was sown May 25 and the sorghum hybrids on May 26, on which date the milo rate-of-seeding and method-of-spacing experiments were also sown. The fourth date-of-seeding plats were seeded June 1.

In a day or so we will start thinning the two earlier date-of- seeding plantings.

Wheat that was not blown out is looking good and heading well.

Maximum temperature for the last half of May was 92° on May 25; minimum, 43° on the 16th and 17th. On May 27 and 28 there was a rainy spell. The total rain for May was 3.40 inches.

KANSAS

Fort Hays Branch Station, Hays (A. F. Swanson). Since May 15, 2 inches of rain in the form of gentle showers has fallen. The weather has been favorable for the growth of all crops.

The seeding of the sorghums and corn was completed on May 22 with the exception of same date plantings of Dawn kafir and milo. All of the sorghums are up but the stand is too thick this year and it will be necessary to do considerable thinning. However, this will make it possible to secure a comparable stand for all varieties.

Reports from farmers seem to indicate that all sorghums germinated well this year due largely to well matured seed last fall and a favorable planting season.

The varieties of wheat on the Cereal Project are in the first stages of heading to 50 per cent headed, except that Nebraska No. 28 is fully headed. Turkey, C.I. No. 1559, and Clark's Blackhull are about two days earlier in heading than the other varieties except Nebraska No. 28.

At present, wheat is free from rust. In the thick rate of seeding where the common 8-inch drill was used in comparison with the lister drill, there is a tendency for lodging to take place in the former method of seeding. In the "top dressing" experiment the application of straw at the rate of 3 tons to the acre seems to have been too heavy.

Wheat which was seeded on a good seed bed will make plenty of straw, but where the seed bed was poor or where the wheat has been heavily pastured,

a practice followed by many of the farmers in this vicinity, the straw will be short.

Mr. John Martin of the Office visited the Station May 30 and 31.

State Experiment Station, Manhattan (John H. Parker). No report.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). Weather conditions durin the last half of May were more favorable to crops in northeastern Colorado than during any period of similar length thus far this season. Unseasonably cold weather during April and the first part of May greatly retarded plant growth and cereal crops are very backward. It is very likely that winter wheat harvest in this section of the Great Plains will start at least two weeks later than it did in 1919. Moisture conditions have been comparatively favorable since April 1, but temperatures have continued below normal throughout both April and May. A precipitation of 0.92 inch was received May 31. This put the soil in excellent condition but with continued low temperatures plant growth is not as rapid as it should be.

Winter wheat prospects are for an excellent crop in those fields in which the stands were not too severely reduced by soil blowing and winterkilling. Winter rye has started to head and winter wheat sown in August or early in September will soon be in the booting stage.

A comparatively small acreage of spring cereals was sown in this part of the Great Plains this year. The reduction in acreage was caused by the extremely unfavorable weather during April, the spread between the prices paid for spring and winter wheat, and the fact that spring grains have produced very light yields as compared with winter wheat and corn during the past four seasons.

Apparently a much larger acreage of corn and forage crops will be planted this season in northeastern Colorado than ever before. Considerable land which the farmers originally planned to seed to spring wheat and barley will be planted to corn and cane since weather conditions prevented the seeding of the cereals. Corn planting in the vicinity of Akron Field Station is possibly half done. At present the fields are too wet to permit much field work.

Cereal Investigations grains at Akron Field Station are growing as well as can be expected under the conditions. The plats of winter rye are heading and the varietal plats of Nebraska Hybrid No. 28 winter wheat are in the booting stage. The plats of winter wheat and the winter grain nursery present a very ragged and uneven appearance. This is due to comparatively poor stands on both of these projects due to soil blowing and winterkilling. The stands in the field plats of spring cereals are comparatively uniform. In some of the nursery rows the stands are very thin. All of the spring-sown cereals are growing rapidly.

An ear-row experiment with 165 ears of Swadley White Dent corn was planted May 20. Thirteen different strains of the same variety selected in 1918 and grown for two years in ear-row experiments were planted May 21. All of this corn is now emerging and from present appearances good stands can be

expected.

About 3,250 individual seeds of Burt oats of some 40 different strains and selections were classified and described and sown in the screen shelter formerly used by Dr. H. L. Shantz in his investigations at Akron. A stand of possibly 2,750 plants has resulted from these seedings and the plants are growing vigorously.

Mr. John Martin of the Office was a station visitor the afternoon of June 1. A trip was made over the different Office projects and future plans were discussed. Mr. Martin left Akron for Salt Lake, Utah, on the evening train.

Supt. O. J. Grace expects to leave Akron Field Station about June 3. He has been in charge of the station for more than ten years. He will engage in farming on his irrigated farm near Scottsbluff, Nebr. Supt. Jos. F. Brandon who succeeds Mr. Grace at Akron Field Station, has been a member of the scientific force of the Office of Dry Land Agriculture for the greater part of the past four or five years, having been stationed at Moccasin, Mont.; Akron, Colo.; and Woodward, Okla. During the war he enlisted in the aviation section of the Army and was commissioned a Second Lieutenant before the end of the war. He was stationed at Akron during the season of 1917, serving in the capacity of assistant superintendent.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). The first half of May was very unfavorable for crop production. The past twelve days were very favorable and during this period practically all farm work has been accomplished. The small cereals are up and a large acreage of corn and sunflowers has been seeded for silage.

This spring has shown the benefits of fall plowing. The farmers are generally averse to this practice but it was a very decisive factor in the dispatch of spring seeding.

The total precipitation for May was 2.07 inches. The lowest temperature for the month was 29° and the highest 82°. The cool weather and adequate rainfall has produced the needed growth of range grass.

~~WYOMING~~

Sheridan Field Station, Sheridan (R. S. Towle). No report.

SOUTH DAKOTA

Bellefourche Experiment Farm, Newell, S. Dak. (A. D. Ellison). A. D. Ellison, County Agent of Butte County and formerly scientific assistant in charge of cereal experiments on the Bellefourche Experiment Farm, writes as follows under date of June 8:

"Winter cereals at the farm were badly winterkilled and the heavy storms this spring washed the plats so badly that it has been thought advisable to plow all those sown last fall. Winterkilling amounted to about 75 per cent, so that if the season had been favorable it is doubtful if it would not have paid to let the crop mature. A few of the recom-

mended varieties of spring cereals were sown. Seeding was late, but growth at present is rapid.

"Spring work has been much delayed and an abnormal rainfall has been recorded on the project. The weather has been cold and stormy, so that spring seeding was late. Weather conditions are now favorable for crop growth, and the indications are that yields will be satisfactory."

Highmore Substation, Highmore (E. S. McFadden). We are having ideal weather for growing crops, with plenty of moisture. The precipitation since April 1st is 7.65 inches, nearly half as much as the annual average. Early-seeded crops are in excellent condition and are making rapid growth. Some of the late-seeded crops failed to produce a good stand as a result of soil crust ing after a heavy rain. This was especially true of late-seeded flax.

All winter wheat in plats killed completely on this station. This was probably due principally to the alternate freezing and thawing during March and April. Even the most hardy winter rye varieties failed to come through with better than half a stand. Rosen rye failed completely, while Wisconsin No. 1 was but little better.

The corn acreage on farms in this locality will be greatly increased this year as a result of the backward spring which delayed seeding of small grains. Considerable prairie is being broken and seeded to flax.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzel). Mr. C. R. Ball, cerealist in charge, visited this station on the 14th inst. to look after the cooperative work now going on at Fargo.

The temperature of the soil has been so low this spring that none of the flax varieties have yet been attacked by the wilt fungus.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.). The weather during the last half of May has continued cold and windy, but without frost.

In spite of high winds and wet weather which interfered with seeding almost every day the sowing of the flax nurseries on clean and diseased land, including seed received from Mr. C. M. Woodworth, was completed May 29. With only one other man helping we sowed 500 five-foot rows on diseased land in a half day.

Flax sown April 15 in the date-of-seeding and tillage experiment looks very well except for the Russian Thistles with which it is badly infested. Flax sown May 1 is not so weedy and flax sown May 15 is so far practically free from weeds. Wilt has appeared in flax sown on diseased land and many plants in the more susceptible strains have already died.

The precipitation of 0.89 inches during the last half of May was just sufficient to keep things growing exceptionally well but more will be needed very soon. The average wind velocity for the last half of May was 8.0 miles

per hour and for the whole month was 7.9 miles per hour. Maximum temperature for the last half of May was 88°, recorded May 22; minimum, 34°, recorded May 21. To-day (June 1) it is so cold that the fires are going in the furnaces.

Dickinson Substation, Dickinson (Ralph W. Smith). During the greater part of the month of May the weather has been dry and very windy. Crops on sandy soil have suffered considerably from soil drifting and cutting off the plants. Possibly 10 per cent of the grain in the vicinity of the substation has been injured or destroyed in this way.

The precipitation for the month was 1.22 inches which is about half the normal precipitation for the month. Most of the rain fell in light showers and the moisture was soon evaporated by drying winds. Good rains are reported to have fallen recently in adjoining counties. There has been no killing frost this month, although the thermometer registered 32° on May 23. The maximum temperature for the month was 86° on May 28.

The stand of grain in the country is generally better than last year, as much of the late-sown grain did not germinate till late in the summer of 1919. Seeding is nearly ended, there remaining some millet and corn to be sown. The acreage of the latter will be increased this year. All seeding at the Substation is completed and in general the stands are good. Stand notes have been taken on plats and nursery and the alleys cultivated. The plats are being trimmed and the roads cultivated.

Rain will be badly needed.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). All of the replicated and single plats were sown May 18 to 20 inclusive, and the cereal nursery was sown May 26 to 28 inclusive. The varieties sown May 18 to 20 have emerged. In all, 63 varieties of cereals were sown in the replicated and single plats and about 170 varieties and selections in the cereal nursery.

Silvermine oats (C.I. No. 714), Lincoln oats (C.I. No. 738), Swedish Select oats (C.I. No. 134), Sixty-Day oats (C.I. No. 165), and Hannchen barley (C.I. No. 531) are being sown to-day for increase. Practically all of the rotation plats and commercial fields of wheat and oats have been sown while the fields of barley and flax yet remain to be seeded. Most of the spring wheat and oats throughout this immediate section has been sown and is now up.

The winter wheat is growing nicely. In the replicated plats Kharkov selection No. 1583-30 is at least 70 per cent larger and greener than any other variety. In the winter wheat nursery 60 varieties winterkilled and of the remaining 100 there are some poor and some exceptionally good stands. The hardiest selections in the nursery are from crosses of Kharkov by Ghirka Winter. However, the two guard rows of Kharkov, C.I. No. 1583 (home grown seed), completely winterkilled. The nursery was seeded October 3 to 6, inclusive.

The furrow drill sowings of winter wheat in the type of drill and straw mulch experiment and in the type-of-drill and rate-of-seeding experiment, as a rule, have a better stand and show more growth and vigor than the ordinary drill sowings regardless of straw mulching or direction of seeding. There is not a great difference at present between the north-and-south and the east-and-west sowings, but the north-and-south sowings seem to have a slight advantage.

In the furrow-drill straw-mulch plats, the plats receiving none or the lighter applications of straw have the best stands and show more growth, due no doubt, very largely to the fact that the heavier applications of straw caught a great deal of drifting soil this winter. On the other hand, the plats receiving the heavier applications of straw with the ordinary drill have the best stands and show the most growth and vigor. This is due to the fact that the straw did not catch much drifting soil on the ordinary drill sowings.

In the type-of-drill and rate-of-seeding experiment the 3-peck and 4-peck rates have the best stand and growth, while with the ordinary drill the 4-peck and 5-peck rates have the best stand and growth. This is true at present regardless of whether the plats were drilled north and south, or east and west.

There was about 25 to 30 per cent more winterkilling on the ordinary drill sowings than in the furrow drill sowings. The precipitatio

The precipitation for May was 2.91 inches, of which 1.06 inches fell during the last four days of the month. The precipitation for the month is 0.13 inch more than the average for the past 22 years. The total precipitation so far this year has been 10.03 inches, which exceeds the total for the entire year 1919 by 0.13 inch. Temperatures this month have been below normal. Spring is at least two or three weeks late.

WESTERN BASIN AND COAST AREAS
(South to North and West).

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). The crops in this section are still later than usual, but the temperatures during the last two weeks have been high enough to favor a vigorous growth of all plants, weeds included. The land to be fallowed, about half of which is plowed, is well covered with a volunteer growth of wheat which is drawing the moisture very rapidly from the soil. All spring plowing should be finished at this time, but the high rainfall during April and early May is responsible for the delay.

The work on the station has been delayed considerably, but by adding more hours to our work-day we have at last caught up with the season. During this last month all potatoes, beans, and corn were seeded in the varietal experiments, and the beans and corn have emerged with good stands. Potatoes and corn were also planted in the rotation experiments. Spring plowing is almost finished, and all roads and allies have been cleaned.

The crops on the station are in excellent condition and from present indications most of the experiments will produce high yields.

The precipitation for May was 1.21 inches; the lowest temperature, 26° occurred on May 3, and the highest 82° on May 21.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). Weather conditions have been rather severe on crops. A frost, with a temperature of 22° on June 1, did considerable damage to small grains, beets, and potatoes. All fruit in this immediate section will be lost this year, as a result of the heavy freeze Precipitation for May has been below normal. The weather has remained cool and crops have been growing very slowly.

Water is being applied to all crops now as rapidly as it can be put on. Part of the old dry farm has been given one irrigation. An excellent stand of alfalfa has thus far been obtained on this new irrigated section of the Station and it is hoped that water can be applied rapidly enough to cover the entire acreage in order to save it. Much of this land has been irrigated before and as a result is taking up an enormous amount of water, and very little land can be covered in a day.

The nursery will be watered June 7 for the first time. Labor shortage and lack of funds is slowing up all the Station field work.

A bulletin on potato experiments at the Aberdeen Substation written during the winter just passed is now being printed by the Idaho Station and will soon be ready for distribution.

OREGON

Harney Branch Station, Burns (Obil Shattuck). No report.

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman Co. Branch Station, Moro (D. E. Stephens). Cool, dry weather prevailed during most of the month of May. During the last week of the month, a temperature of 31° was recorded on two nights. The precipitation for the month was only 0.23 inch. The normal rainfall for the month of May is 1.16 inches. The total precipitation since January 1, 1920 has been only 3.00 inches, or about 2.5 inches less than normal for that period.

On account of the cold backward spring, winter grains are about ten days later thin heading than usual. Some of the early-sown winter wheat is now about 50 per cent headed. Considerable early-sown winter wheat, which has made a rank growth, is now beginning to burn, and unless there is rain soon, yields in this section are not likely to be nearly as high as last year. In the tillage experiments on the Station, the winter wheat on plats frequently cultivated in 1919 is beginning to burn, while the wheat which has made a less vigorous growth on the plats on which the fallow was neglected in 1919 is not yet suffering for moisture and from present indications will mature normally.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). No report.

Plant Introduction Station, Chico (V. H. Florell). All varieties of barley are now fully ripe. Harvesting will be delayed a week or ten days in order to get a better test on shattering. Over 700 rows of the barley selection nursery have been mowed for hay on account of lack of uniformity in growth due to soil variation. This group was sown in triplicate 20-foot rows and it was found necessary to eliminate both of the replications. The remaining series is fairly uniform.

About half of the oats varieties are fully ripe, with the remaining ones ripening rapidly. Most flax varieties show a few ripe bolls.

A number of the early maturing wheat varieties are fully mature. Both the Hard and the White Federation increase fields at the Gardens are ripe and will be harvested as soon as possible. These varieties have filled well and a good yield is promised.

Although the grains in the vicinity of Chico are in fairly good condition many fields have suffered from the drought. A three or four day norther began about May 20, causing severe injury to a large part of the grain fields in the Sacramento Valley. The greatest injury resulted on the lighter lands in the central portions. Late sown grains as usual suffered most. Thousands of acres of both wheat and barley have been mowed for hay. The practical value of early sowing has been clearly demonstrated this season. The season has also shown the advantage of earlier maturing varieties. The early sown Federation wheats (November) were in the stiff dough at the time of the norther and were beyond serious injury. Commercial fields of California Mariout barley were also ripe at this time and escaped injury except on very shallow land.

Prof. G. W. Hendry of the University Farm at Davis visited the Gardens within the past week. His mission in visiting Chico was to inspect the fields of California Mariout barley sown in the vicinity. The Mariout has demonstrated its value during a dry year on account of its earliness. Its short straw, however, may be a source of trouble in harvesting. The variety probably will be found to be particularly adapted to certain types of land where earliness is necessary.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION)

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Vol. 12. June 21, 1920. No. 13.
Personnel (June 11-20) and Field Station (June 1-15) Issue.

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PERSONNEL ITEMS

Carl D. Adams, field assistant in the barberry eradication campaign in Wisconsin since May 1, has resigned, effective June 19, to accept a position in the office of the State Entomologist of the Wisconsin State Department of Agriculture.

Floyd G. Anderson, of Pinckneyville, Ill., a student at the University of Illinois, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Illinois.

Mr. C. R. Ball, Cerealist in Charge, returned on June 16 from an inspection trip covering cooperative experiments in the States of Ohio, Indiana, Illinois, Iowa, Nebraska, and Kansas. In Indiana, Iowa, Nebraska, and Ohio, conferences were held with reference to the new alignment of the barberry eradication campaign in cooperation with the extension divisions of the State colleges. All indications point to the hearty and effective cooperation between all the State agencies involved in the locating and eradicating of the barberry in those States. In Indiana and Iowa special attention was given to the progress in the investigation of leaf rusts and the crown rust of oats, respectively. In Illinois and Indiana the cooperative experiments on corn rots and take-all and flag smut were studied in laboratory, greenhouse, and field. This included a visit to the farm at Wanatah in northern Indiana, where take-all experiments are being conducted, and to the farm in Madison County, Ill., where experiments on both take-all and flag smut are under way. In Iowa, cooperative experiments on smut control and cereal breeding were

discussed. In Kansas, the cooperation covers stem rust investigations, studies of smuts of corn and sorghums, and breeding for rust resistance and winter resistance in wheat.

All the cooperative investigations listed above were found in an excellent state of progress, hampered only by inadequate funds in some places. The principle of widely distributed State cooperation in an attack on major problems is fully justified by the progress and results of the cooperative enterprises in this group of States.

Merle L. Benshoof, of New Rockford, N. Dak., a student at the North Dakota Agricultural College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in North Dakota.

Walter L. Blain of Columbia City, Ind., a graduate of Wabash College and a student at the University of Illinois, has been appointed field assistant to assist in the barberry eradication campaign in Illinois. He rendered similar service from April to September, 1919.

Harvey E. Brewbaker of Bushnell, Ill., a student at the University of Illinois, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Illinois.

Lester W. Bullard of Casselton, N. Dak., a student at the North Dakota Agricultural College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in North Dakota, He was similarly employed from March to September, 1919.

Paul L. Byrd of Crawfordsville, Ind., a student at the University of Illinois, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Illinois. He was connected with the blister rust control work conducted by the Bureau of Plant Industry from May to September, 1919.

Robert S. Caruthers, of Washington, D. C., who has served as messenger in the Office of Cereal Investigations during the past two summers, has been reinstated for similar work, effective June 16.

J. Allen Clark reports that the Western Agronomic Conference was held at Berkeley, Cal., June 8 and 9, and at University Farm, Davis, Cal., June 10. Representatives of the U. S. Department of Agriculture and of six western States were present at the conference. Among the subjects discussed were the use of power in tillage and harvesting; soil alkali as related to crop production; crop diseases and treatments; and soil tillage and rotation as related to cereal production. Representatives of the Office of Cereal Investigations who attended the conference were J. A. Clark and John H. Martin of the Washington office; W. W. Mackie of Berkeley, Cal.; V. H. Florell of Chico, Cal.; J. W. Jones of Biggs, Cal.; D. E. Stephens of Moro, Oreg.; and Max A. McCall of Lind, Wash. Mr. Clark presented three reels of motion pictures showing modern operations in wheat production. Professor Mackie discussed diseases of farm crops with particular relation to preventive treatments, and Mr. Stephens presented some of the results obtained in the tillage and rotation experiments at Moro. On June 10, the field experiments in progress on the University Farm at Davis were inspected. The 1921 conference will be

held in Arizona, the exact date to be determined by the program committee, consisting of Prof. G. E. Thompson of the University of Arizona, Prof. J. W. Gilmore of the University of California, and Roland McKee of the Department of Agriculture.

Raymond A. Dobbins of Ada, Ohio, a graduate of Ohio Northern University and a member of the 1920 graduating class of Ohio State University, has been appointed field assistant effective July 1, to assist in the barberry eradication campaign in Ohio.

Anton E. Flamer of Milnor, N. Dak., a student at the North Dakota Agricultural College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in North Dakota.

William B. Gass of Larimore, N. Dak., a student at the North Dakota Agricultural College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in North Dakota.

LeRoy G. Gordner of Boonville, Ind., a student at Purdue University, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Indiana.

Robert W. Goss, assistant pathologist, who has been engaged in corn rot investigations at the University of Wisconsin under the direction ofDr. A. G. Johnson, has resigned, effective July 1, to accept a position at the University of Nebraska.

Dr. H. V. Harlan left Washington June 14 for Manhattan, Kans., and from there will go to Chico, Cal., and Corvallis and Moro, Oreg., in connection with barley investigations. He will reach Aberdeen, Idaho, late in June and will then resume the physiological studies of the growth and development of barley which he has been conducting there during the past several summers.

C. P. Hartley left Washington June 19 for Rhinebeck N. Y., and other points in New York and New England to inspect experiments in corn improvement. Before returning to Washington, he will visit the corn breeding experiments at Piketon, Ohio.

Dr. H. B. Humphrey returned to Washington June 17 from a two-weeks inspection of cereal-disease experiments in Indiana, Illinois, Wisconsin, and Minnesota.

Sylvester S. Humphrey of Zanesville, Ohio, a student at the Ohio State University, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Ohio.

William A. Kurtz of Pipestone, Minn., a student of South Dakota State College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in South Dakota.

Wilfred D. Mills, of Tecumseh, Mich., a member of the 1920 graduating class of Michigan Agricultural College, has been appointed field assistant effective July 1, to assist in the barberry eradication campaign in Michigan.

Walter G. Parish of Gary, S. Dak., has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in South Dakota. During the school year he was superintendent of schools at Gary.

Joseph H. Permar of Castle Shannon, Pa., a student at the Michigan Agricultural College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Michigan.

Merritt N. Pope left Washington June 14 for Aberdeen, Idaho, where he will assist Dr. Harry V. Harlan in his studies of the development of barley on the Aberdeen substation.

Dr. George M. Reed returned to Washington June 14 from a two-weeks trip to inspect cereal smut experiments in Indiana and Illinois.

Albert S. Severson of Hettinger, N. Dak., a ~~ex~~ graduate of the North Dakota Agricultural College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in North Dakota.

Ernest L. Stover of Columbus, Ohio, a graduate of Ohio State University and now a graduate student at that institution, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Ohio.

Walter G. Stover, collaborator and State leader of the barberry eradication campaign in Ohio, has resigned effective June 30, as he is leaving the State to engage in graduate study at the University of Wisconsin.

Matthew E. Tindall of St. Cloud, Minn., a student at the North Dakota Agricultural College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in North Dakota.

Hugh M. Trowbridge, of Fargo, N. Dak., a member of the 1920 graduating class at the North Dakota Agricultural College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in North Dakota.

Archie M. Waldie of Dickey, N. Dak., a member of the 1920 graduating class at the North Dakota Agricultural College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in North Dakota. He was similarly engaged in August and September, 1919.

Lyle M. Wilson, a graduate of the Michigan Agricultural College and now a teacher in the Adrian, Mich., High School, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign.

Miss Grace O. Wineland, scientific assistant in plant pathology, who has been on leave without pay since May 16, was restored to the rolls June 1, and is again assisting Dr. A. G. Johnson in investigations of wheat scab and corn rot.

VISITORS

Dr. E. D. Ball, Professor of Zoology at Iowa State College and State Entomologist, was an Office visitor June 11, at which time he conferred regarding the conduct of the barberry eradication campaign in Iowa. Under the Iowa law Dr. Ball is charged with the enforcement of the act requiring the eradication of the harmful barberries in that State. Doctor Ball's appointment as Assistant Secretary of Agriculture was announced June 12.

Prof. Andrew Boss, head of the Department of Agronomy and Farm Management in the Minnesota College of Agriculture, was an office visitor June 19, when he discussed cooperative experiments in cereal production and breeding at the Minnesota Agricultural Experiment Station.

Ellery C. Chilcott, Superintendent of the Woodward Field Station, Woodward, Okla., and John M. Stephens, Superintendent of the Northern Great Plains Field Station, Mandan, N. Dak., were office visitors June 11, at which time cooperative experiments on these stions were discussed. Mr. Chilcott is superintendent of field stations for the Office of Dry Land Agriculture in the southern Great Plains, and Mr. Stephens has similar supervision of stations in the northern Great Plains.

Dr. S. B. Fracker, State Entomologist of Wisconsin and collaborator in the barberry eradication campaign, was an Office visitor June 18, when he discussed the conduct of that campaign in Wisconsin. As State Entomologist, he is charged with the enforcement of the Wisconsin crop pest law,

Harry R. O'Brien, who was connected with the barberry eradication campaign during the summer of 1918, was an Office visitor June 18. He has recently accepted a position on the editorial staff of The Country Gentleman.

Paul C. Taff, leader of Boys and Girls Clubs and assistant director of extension in Iowa, was an Office visitor June 16, when he discussed extension features of the barberry eradication campaign in that State.

J. van de Griendt of Griendtsween, Holland, was an Office visitor June 10.

John J. Vernon, formerly director of the New Mexico Agricultural Experiment Station and later agriculturist at the Florida station, was an Office visitor June 16. Mr. Vernon is now engaged in farming at Palmyra, Va.

On June 17, 18, and 19, the work of the Department of Agriculture was inspected and studied by the members of the newly organized Association of Agricultural Editors, representing many of the leading farm papers of the United States. Fifty editors were invited to attend the conference, and of these about 30 were present. The party was divided into committees, each of which made a special study of the work of certain bureaus. The committee assigned to the Bureau of Plant Industry and the Bureau of Soils consisted of John Fields of the Oklahoma Farmer, Chairman; G. H. Hunnicutt of the Southern

Cultivator and Dixie Farmer; C. W. Pugsley of the Nebraska Farmer; and John Thompson of the Iowa Homestead. These men met the Chief and Associate Chief of the Bureau and the heads of the various offices in a conference June 17, and at the same time similar groups met the officials of other bureaus. On the afternoon of June 19, about a dozen of the editors inspected the experiments which are in progress at Arlington Farm. The conference was a very helpful one, resulting in a better understanding and appreciation of the work of the Department by the agricultural editors. The party was so well pleased with what they saw that there was considerable demand for opportunity for further study, and quite possibly another meeting of the association will be held in Washington within the next few months, at which time there will be further conferences with Department officials.

PUBLICATIONS.

Galley proof of Farmers' Bulletin 1141, "Rice Growing in California," by Charles E. Chambliss, was read June 18.

A paper entitled "The Production of Conidia in Gibberella saubinetii," by James G. Dickson and Helen Johann, was printed in the Journal of Agricultural Research, vol. 19, no. 5, pages 235 and 237, issued June 1, 1920.

Galley proof of Department Bulletin 869, "The Inheritance of the Length of Internode in the Rachis of the Barley Spike," by Prof. H. K. Hayes of the Minnesota College of Agriculture and Dr. Harry V. Harlan, was read June 18.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). The weather for the past ten days has been very hot and dry.

Winter oat varieties are practically all ripe. Winter wheat varieties are ripening rapidly and most of them will be cut this week.

Black stem rust of wheat is being reported from different parts of the State. The first report came June 8. Oat leaf rust has increased very much

the past week. Prof. Essary reports as high as 100 per cent in Henderson County. Scab has appeared on both wheat and rye, but the extent of the infection and the damage cannot be estimated at this time.

NORTH CAROLINA

State Experiment Station, West Raleigh, and Substations (G. M. Garren). No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). T. R. Stanton reports as follows regarding experiments with winter oats on Arlington Farm:

About the poorest crop of winter oats that has been grown since cereal work was begun at the Arlington Farm will be harvested this year. The long, cold winter with almost continuous low temperatures, followed by a cold, backward spring, was exceedingly unfavorable to winter oats. There was no chance for recovery and, as a consequence, chickweed and dog fennel have smothered out what remained of the crop. The hardy Winter Turf oat has fared nearly as badly as the more tender varieties. Of the three series of fortieth-acre varietal plats only one will be harvested. The other two were so poor and so badly infested with weeds that they have been plowed.

The nursery is in no better condition, practically all the strains of Fulghum, Red Rustproof, Aurora, etc., having entirely winterkilled. The black winter variety known as Hutchison's selection, a similar oat (C. I. No. 838), selected at Arlington Farm, and some of the Culberson strains have shown the highest percentages of recovery. An early selection from a cross between Aurora and Winter Turf also has shown a high percentage of survival and may be of some promise as a winter oat.

NEW YORK

Cornell University Experiment Station, Ithaca (W. T. Craig). No report.

INDIANA

Indiana Agricultural Experiment Station, LaFayette (H. S. Jackson and E. B. Mains). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). We are now making our selections of wheat and oats in the nursery plats on the experiment station field. Several hundred selections will be made this season. The condition of crops on the station field is good, considering the character of the season.

Over the State as a whole, wheat is in poor condition and oats in moderate condition. Corn planting is just being completed in the northern part of the State. The oat acreage is about the same as that of last year, and the corn acreage about 10 per cent more than that of 1919.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

GREAT PLAINS AREA (South to North)

TEXAS

Amarillo Cereal Field Station, Amarillo (John F. Ross). No report.

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). Thus far, June has been rather dry and hot. As there have been no rains to interrupt the work, most all the plats have been thinned and trimmed.

The sorghums in the fourth date-of-seeding plats emerged to good stands on June 6 and 7.

The fifth date-of-seeding plats were seeded June 15 in dry soil. The plants will not emerge till rain falls.

Most of the sorghums have been making a rapid growth. For example, milo in the rate-of-seeding and method-of-spacing experiment, which was seeded on May 26, emerged to a stand on June 1, and was about 5 inches tall on June 15, when it was thinned. It is doubtful if they continue to grow so rapidly unless rain comes soon.

Wheat over the country is turning and harvest will be early. Some of the plats of wheat on the Dry-Land Project will probably be harvested the latter part of this week.

Maximum temperature for the month to date was 100°, on June 15; minimum, 53° on June 5. Precipitation, June 2, 0.02 in.; June 4, 0.26 in.; June 5, 0.01 in.; total 0.29 in.

(Above is report of Cereal Project for first half of June.)

KANSAS

Fort Hays Branch Station, Hays (A. F. Swanson). Dry, windy weather with no moisture since May 26 has greatly reduced the prospects for a big wheat crop in the vicinity of Hays. Some local showers throughout the surrounding country have been helpful in local areas.

The wheat on the Cereal Project is in the milk stage, with the exception of Nebraska No. 28, which is in the soft dough stage. A rain within the next few days is greatly needed for the small grains. The late varieties of barley are suffering. Mariout, Stravopol, and White Smyrna are standing the drouth well.

Burt X Sixty-Day and Fulghum are the earliest varieties of oats. These are probably far enough along to escape the drouth, but the continuous wind has caused Fulghum oats to lodge badly. Later varieties, as Aurora, Richland, and Iowar, are suffering.

The sorghums on the Cereal Project have all been cultivated and are doing well. Warm nights and plenty of moisture in the subsoil are favoring their rapid growth. A crew of men is now at work thinning the stand, and to-morrow a count of the stand will be made.

The Hessian fly problem has developed as a serious menace, with infections ranging from 5 to 90 per cent.in different fields, being most prevalent in volunteer wheat. In a survey made by members of the Station staff, fly has been found from Hays to the Nebraska line, and the insect is known to be as far as 50 miles south of Hays.

Saturday, June 19, will be "Wheat Day" at the Fort Hays Experiment Station. The experiments conducted by the Office of Cereal Investigations and the Office of Dry Land Agriculture will be explained to visitors and farmers. The program will be held in the field and because of the severe climatic conditions some sharp contrasts are expected.

J. Allen Clark visited the Station June 4. He was accompanied by Prof. John H. Parker from the Kansas College of Agriculture.

State Experiment Station, Manhattan (John H. Parker). No report.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). No report.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). The rainfall for the past fifteen days has been very slight, totaling 0.11 inch. The temperature has been mild, the maximum being 87° and the minimum 39°. Evaporation has been rather high and wind velocity low.

These conditions were favorable to crop production until the last few days. Crops seeded on late fall plowing, disked corn stubble, and fallow are doing well, while those seeded on spring plowing are suffering greatly. Since May 20 there has been no precipitation which would affect crop production. As practically all spring plowing was done after that date, it is obvious that the loose soil in which the crops were seeded has dried considerably.

As the United States Department of Agriculture has been compelled to discontinue cooperation with the State of Wyoming in carrying on the experiments on the Cheyenne Experiment Farm because of reduced appropriations after July 1, the State has decided to continue all experiments, including the tillage and rotation experiments of the Office of Dry-Land Agriculture. The last of the spring work on this project is now being completed.

The annual "Farmers' Day" at the Cheyenne Experiment Farm has been set for July 14. The County Farm Bureau is making it their annual outing and it is expected to be a day of considerable importance.

Sheridan Field Station, Sheridan (R. S. Towle). No report.

SOUTH DAKOTA

Bellefourche Experiment Farm, Newell, S. Dak. (A. D. Ellison). No report.

Highmore Substation, Highmore (E. S. McFadden). No report.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzel). No report.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.). Duri the first few days of June the weather continued cold and disagreeable. For the past ten days, however, it has been generally very warm and dry. Precipitation for the half month was only 0.39 inch. Field crops are beginning to turn brown and will suffer greatly unless we have rain very soon.

Wheat, oats, and barley varieties are in the boot. First blooms appeared June 14 in flax sown April 15. Weeds have been making very rapid growth durin the recent warm dry period.

The flax-wilt disease is developing more rapidly on the diseased land and is having a marked effect on the susceptible strains of flax. Resistant strain are standing up well, though suffering to some extent as a result of drought and the depredations of cutworms, grasshoppers, and blister beetles.

Preparations are under way for a farmers' picnic to be held Friday, June 18, under the direction of Mr. Max Morgan, County Agent for Morton County. A pit silo is being constructed for demonstration purposes.

Mr. C. M. Woodworth arrived Tuesday, June 15, for observations and note-taking in flax-disease experiments.

Maximum temperature for the half month was 93°, recorded June 15; minimum, 36°, recorded June 2.

Dickinson Substation, Dickinson (Ralph W. Smith). Crop conditions have improved considerably during the first half of June, due to several good showers, the best of which was on June 5, when 0.81 inch of rain fell. The total precipitation for the month to date is 1.60 inches, which is about the amount that fell last year during the three summer months. A rain also fell on the night of May 31, making a total of 1.39 inches for May this year.

Cereal crops on the Substation are in good condition and are making rapid growth. The plats have been trimmed and the alleys cultivated twice. The nursery has been cultivated and hoed. Plat stakes are being placed.

C. F. Ainslie, Government Entomologist, has been investigating the cut worms and sugar beet web-worms in this vicinity. The cutworms, while quite numerous, are not doing so much damage as last year. They are doing damage to corn and gardens and probably to some extent in grain fields, but some of the damage reported as being caused by the cutworms is due to the grain being injured by drifting soil in windy weather. The moths of the sugar-beet web worm are numerous in this locality but as they prefer Russian thistles to most of the grain crops and these weeds are numerous, it is not anticipated that the grain fields will suffer from these pests.

Hot weather has prevailed during the past ten days, reaching a maximum of 93° June 9. The minimum was 31°, accompanied by a light frost on June 4. But little damage was done.

MONTANA

Judith Basin Substation, Moccasin (Ralph T. May). The precipitation for the first 15 days of June was 1.52 inches, practically all of which has fallen since the 10th. This is about half the normal amount for the entire month of June, so that the precipitation has been about normal.

The soil contains an abundance of moisture and the prospects is for a large crop. However, some fields of winter wheat which were stubbled in have a pale green color. This condition is probably due to poorly developed root systems, but the recent rains have already greatly improved the color of the wheat. Some farmers harrowed their wheat and apparently improved its color and vigor. None of the wheat on the Experiment Farm was affected in this way.

All crops sown this spring are up and growing nicely. Kharkov selection, C.I. No. 1583-30, still maintains the lead for amount of growth of the winter wheat varieties in the replicated plats, but Minhardi, Buffum No. 17, and Minturki are making rapid gains. Kharkov, C.I. No. 1583 has made the least growth of any of the varieties. Some of the hybrids in the winter wheat nursery are looking exceptionally good.

Temperatures have been above normal. At present crops need some clear, hot growing weather.

Director F. B. Linfield of the Montana Agricultural Experiment Station visited the substation June 14.

WESTERN BASIN AND COAST AREAS
(South to North and West).

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). No rain has fallen in this section since May 22. The prospects for a large wheat crop on the Levan Ridge were never better on June 1, but during the last two weeks the drouth has reduced the condition of both fall and spring wheat at least 25 per cent. Spring plowing is almost finished.

On the station, all of the fall-sown cereals are heading. Clark Black Chaff wheat, C.I. No. 6251, a recent introduction at Nephi, appears to be our best fall wheat. The spring wheats, Marquis, Little Club, Early Baart, and Kubanka, which were fall sown, survived the winter with good stands. These wheats are now in good condition and are heading earlier than the fall varieties.

All corn, potato, and bean varieties have emerged with good stands. Corn, potatoes, and peas are making a vigorous growth in the rotation experiments. Alfalfa in the rotation has just been cut.

On June 5, Mr. John Martin, assistant in western wheat investigations, visited the station.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Harney Branch Station, Burns (Obil Shattuck). No report.

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman Co. Branch Station, Moro (D. E. Stephens). No report.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). No report.

Plant Introduction Station, Chico (V. H. Florell). No report.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION)

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Vol. 12. June 30, 1920. No. 14.
Personnel (June 21-30) and Project Issue.

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PERSONNEL ITEMS

Robert W. Adams of Barron, Wis., a graduate of the University of Wisconsin and now a graduate student at that institution, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Wisconsin. Mr. Adams was engaged in the blister rust control work for the Bureau of Plant Industry from July to September, 1919.

Francis M. Baldwin, a graduate of Clark University, has been appointed field assistant, effective July 1, for a 3-months period in connection with the barberry eradication campaign in Iowa. Mr. Baldwin, who is assistant professor of physiology at Iowa State College, has the degree of Ph.D. from the University of Illinois.

Ira L. Baldwin, a 1919 graduate of Purdue University, has been appointed field assistant, effective July 1, ~~xx~~ in connection with the cooperative corn disease investigations which are being conducted at La Fayette, Ind., under the direction of Dr. G. N. Hoffer. Mr. Baldwin rendered similar service from June 10 to September 10, 1919, since which time has has been engaged in graduate study at Purdue University.

Elmer D. Ball, collaborator in the barberry eradication campaign in Iowa, has resigned, effective May 31, he having been appointed Assistant Secretary of Agriculture.

Theodore Ballard, who has been employed as laborer on the Cheyenne Field Station since May 24, became dairyman at that station on June 20.

Edwin B. Bothe, superintendent of schools at Wadena, Minn., a graduate of the College of Agriculture of the University of Minnesota, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Minnesota. He was similarly engaged in July and August, 1919.

Wallace Butler of St. Paul, Minn., a graduate of the University of Minnesota, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Minnesota. Mr. Butler was similarly employe during the summer of 1918 and was engaged in investigations of black and stri rust during the summer of 1919.

Nathaniel R. Carmichael, of Lamoni, Iowa, a 1918 graduate of Iowa State College, has been appointed field assistant for a 3-months' period, effective July 1, in connection with the barberry eradication campaign in Iowa. Mr. Carmichael is at present assistant entomologist at Iowa State College.

LeRoy F. Catterson of New Sharon, Iowa, a 1920 graduate of Iowa State College, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Iowa.

Stewart R. Cooper, of Lansing, Iowa, a 1919 graduate of Iowa State College has been appointed field assistant, effective July 1, in connection with the barberry eradication campaign in Iowa. Mr. Cooper was similarly engaged from August 22 to November 30, 1919, since which time he has been employed by the Iowa Corn and Small Grain Growers' Association.

Gordon C. Curran of St. Paul, Minn., a member of the 1920 graduating class of the College of Agriculture, University of Minnesota, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Minnesota. He was similarly engaged from April to October, 1919.

Ralph E. Curtiss of Marengo, Ill., a 1917 graduate of the University of Illinois, and now a graduate student at the University of Minnesota, has been appointed field assistant, effective July 1, for service in connection with the barberry eradication campaign in Minnesota. He was similarly engaged from February 20 to September 25, 1919.

Charles Drechsler, assistant pathologist, who has been on leave without pay since March 1, 1920, was transferred to the Office of Cotton Truck Disease Investigations on June 1. Dr. Drechsler will be located at Brooklyn, N. Y., where he will study storage rots of truck crops.

Leo J. Federer of Madison, Wis., a student at the University of Wisconsin has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Wisconsin. He was similarly engaged in August and September, 1919.

Gardner M. Garren, assistant agronomist of the North Carolina Agricultural Experiment Station, has resigned his appointment as agent, effective June 30. Mr. Garren has been in direct charge of the cereal experiments conducted in cooperation with the North Carolina station since October 1, 1917.

Arthur N. Gausemel of St. Paul, Minn., a graduate of the University of

Minnesota, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Minnesota. During the school year Mr. Gausemel was superintendent of Sibley School at St. Paul.

Eugene B. Holden, who has been assisting Dr. A. G. Johnson in investigations of corn rot and wheat scab at Madison, Wis., has resigned, effective June 12.

George W. Hood, a graduate of Ohio State University, and now assistant in the Horticultural Department at the University of Nebraska, has been appointed field assistant, effective July 1, for a 3-months period in connection with the barberry eradication campaign in N Nebraska.

Walter J. Ingram of Rice Lake, Wis., a student at the University of Wisconsin, has been appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Wisconsin.

Dr. Annie M. Hurd, who was transferred February 16 to the Office of Physiological and Fermentation Investigations because of shortage of funds on the black and stripe rust project, has been transferred back to the Office of Cereal Investigations, effective July 1. Dr. Hurd will continue her investigations of cereal rusts.

C. O. Johnston, who has been on leave without pay since April 1, has been restored to the rolls effective July 1, and will continue his investigations with cereal rusts in cooperation with the Kansas Agricultural Experiment Station.

P. Denton Joseph, a graduate of Ripon College and a postgraduate student at Iowa State College, has been appointed field assistant, effective July 1, to assist in smut investigations in cooperation with the Iowa State College. Mr. Joseph was employed in the barberry eradication campaign from June to September, 1919.

Miss T. Enid King, whose resignation was noted in the April 30 issue of the Cereal Courier, was married June 23 at Columbus, Ohio, to Ralph W. Brown, formerly grain supervisor in the Bureau of Markets and who is now engaged in business at Cincinnati, Ohio.

R. W. Leukel, visited the experimental plats at Morrissville and Woodstock, Va., during the last week of June to gather data on the longevity of wheat nematodes in the soil. Interesting results have been secured regarding the crop rotations necessary to eradicate nematodes in the soil.

E. F. McFadden, scientific assistant, who has been in charge of cooperative experiments on the Highmore Substation, Highmore, S. Dak., since March 1, 1918 except for a period of military service from June 1, 1918 to January 10, 1919, has resigned, effective June 30. This action was necessary because of the termination of the cooperation, due to reduced funds available for the Office of Cereal Investigations during the fiscal year 1921. It is the understanding that Mr. McFadden will be retained temporarily by the State, and that later he will engage in farming in South Dakota with his father.

Leonard W. Melander of Red Wing, Minn., now an assistant in the Department of Plant Pathology at the University of Minnesota, has been appointed field assistant, effective June 21. Mr. Melander has succeeded Mark A. McCarty as State Leader in charge of the barberry eradication campaign in Minnesota.

A. L. Nelson, who has been in charge of the cooperative experiments on the Cheyenne Experiment Farm, Archer, Wyo., for the past two years, will be retained as superintendent of the farm by the State after Federal cooperation ceases June 30, on account of reduced appropriations for the Office of Cereal Investigations during the fiscal year 1921. Mr. Nelson will retain connection with the Office, his title having been changed from scientific assistant to collaborator.

Charles E. Owens, assistant pathologist in charge of investigations of stripe rust in cooperation with the Oregon Agricultural Experiment Station, has resigned, effective June 30, to take a full-time position on the teaching staff of the Oregon Agricultural College.

John F. Ross, who has been superintendent of the Amarillo Cereal Field Station, Amarillo, Tex., since 1908, has resigned effective June 30. This action was made necessary by the closing of the Amarillo Cereal Field Station, due to the shortage of funds caused by the reduction in the appropriation for Cereal Investigations during the fiscal year 1921. Mr. Ross expects to remain at Amarillo and to receive appointment as a licensed grain inspector under the Bureau of Markets.

John H. Rushmeier, who has been under appointment as laborer at the Adams County Branch Station, Lind, Wash., since May 1, has resigned, effective June 30.

Jerome P. Seaton, a 1919 graduate of Pennsylvania State College and instructor in soils at Purdue University during the past year, has been appointed field assistant, effective June 17, for a 3-months period, in connection with the cereal experiments on Arlington Farm. Mr. Seaton rendered similar service there from July to September, 1919.

Obil Shattuck, superintendent of the Harney County Branch Station, Burns, Oreg., has resigned as agent, effective June 30, because of the discontinuance of the cooperative experiments at this station, due to reduced funds. Mr. Shattuck has been under appointment since February 1, 1919.

Stephen M. Spangler, who was under appointment in connection with the cooperative cereal experiments at the University of Tennessee from December 12, 1918 to June 10, 1919, and again since March 16, 1920, has resigned, effective June 30, because the cooperation has been discontinued, due to the reduction in Cereal Investigations funds during the fiscal year 1921.

Jacob F. Stump, teamster, who has been employed at the Amarillo Cereal Field Station since March 1, 1909, has resigned effective June 30, due to the closing of the Amarillo station.

Lloyd E. Thatcher of Oregon, Mo., a graduate of the University of Missouri now an instructor in zoology at the University of Michigan, has been appointed

field assistant, effective July 1 for a 3-months' period, in connection with the barberry eradication campaign in Nebraska. Mr. Thatcher was similarly employed from March to October, 1919.

Noel F. Thompson of Yakima, Wash., a graduate of the University of Washington, has been reinstated as assistant pathologist, effective June 21, and will immediately take charge of the direction of the barberry eradication campaign in Wisconsin. Mr. Thompson was connected with the smut-control campaign conducted by the Office of Cereal Investigations from August, 1917, to June, 1919, with the exception of a period of military service. During the past year he has been an instructor at the University of Idaho.

Charles W. Van Cleve, city superintendent of schools at Le Seuer, Minn., has been appointed field assistant for a 3-months period, effective July 1, to assist in the barberry eradication campaign in Minnesota. Mr. Van Cleve, who is a graduate of the University of Kansas, rendered similar service from August 1 to September 3, 1919.

Duane E. Walrath of Albion, Nebr., a student at the University of Nebraska, has been appointed field assistant, effective July 1, in connection with the barberry eradication campaign in Nebraska. He was similarly employed from May 21 to December 20, 1919.

John C. West, superintendent of schools at Sauk Centre, Minn., has been appointed field assistant for a 3-months period, effective July 1, in connection with the barberry eradication campaign in Minnesota. He was similarly employed from July 1 to September 6, 1919.

John O. Zacek, laborer on the Belle Fourche Experiment Farm, has been transferred to the rolls of the Office of Western Irrigation Agriculture, effective July 1, as the service for which he was appointed has been completed.

George L. Zundel, agent, who has been employed in cooperation with the division of extension of the Washington Agricultural Experiment Station in the control of cereal diseases, has resigned, effective June 30, to accept a full-time appointment from the cooperating agency.

VISITORS

Gardner M. Garren, assistant agronomist of the North Carolina Agricultural Experiment Station and agent in charge of the cooperative experiments with cereals, was an Office visitor June 23 and 24. While here he spent considerable time at Arlington Farm in studying cereal experiments conducted there.

Thomas F. Hunt, Dean of the College of Agriculture of the University of California, was an Office visitor June 30, at which time experiments which are being conducted in cooperation with the California Agricultural Experiment Station were discussed. Dean Hunt is now on a year's leave of absence and is at present engaged in the revision of his agricultural text books. He expects to sail July 14 for England, where he plans to make an extended stay.

Dr. E. B. Mains of the Purdue University Agricultural Experiment Station, who assists Dr. H. S. Jackson in cooperative investigations of leaf rusts, was an Office visitor June 21 to 23, during which time he took leaf-rust notes on the extensive cereal experiments at Arlington Farm.

Loy E. Rast, formerly assistant agronomist at the Georgia College of Agriculture and in charge of cooperative cereal experiments during the war service of Ross R. Childs, was an Office visitor June 26. Mr. Rast is now employed by the Southern Fertilizer Association with headquarters at Shreveport, La.

PUBLICATIONS

A brief paper entitled "Relative Yields of Broken and Entire Kernels of Seed Corn," by Ernest B. Brown, was submitted to the Chief of the Bureau June 2 for approval of publication in the Journal of the American Society of Agronomy.

Galley proof of Department Bulletin 877, "Australian Wheat Varieties in the Pacific Coast Area," by J. Allen Clark, David E. Stephens, and Victor H. Florell, was read June 26.

Galley proof of Department Bulletin 878, "Varietal Experiments With Spring Wheat in the Northern Great Plains," by J. Allen Clark, John H. Martin, and Ralph W. Smith, was read June 30.

Copies have been received of South Dakota State College Extension Circular No. 33, entitled "Barberry Eradication," by Dr. A. N. Hume, State Leader, and Henry C. Gilbert, Assistant State Leader. This is a 24-page discussion of the relation of the common barberry to stem rust and a report of progress of the barberry eradication campaign in South Dakota.

A manuscript entitled "Varieties of Winter Wheat Adapted to the Eastern United States," by Dr. C. E. Leighty, was submitted to the Chief of the Bureau June 16 for publication as a Farmers' Bulletin. It is intended that this bulletin shall replace Farmers' Bulletin 616, entitled "Winter Wheat Varieties for the Eastern United States."

A brief paper entitled "The Effect of Citric Acid on Germination of the Teliospores of Puccinia graminis tritici," by A. F. Thiel and Dr. Freman Weiss, was submitted to the Chief of the Bureau June 23, for approval of publication in Phytopathology.

Page proof of Farmers' Bulletin 1119, entitled "Fall-Sown Oats," by C. W. Warburton and T. R. Stanton, was read June 25.

A recent bulletin of interest to field and office employees is Farmers' Bulletin 1118, entitled "Dockage Under the Federal Wheat Grades," by Ralph H. Brown, grain supervisor of the Bureau of Markets. This is a well-illustrated 28-page discussion of the material designated as dockage by the Federal wheat grades, its value, and the method of determining it.

REVISION OF FISCAL REGULATIONS.

The following memorandum has been received from Dr. K. F. Kellerman, Associate Chief of Bureau. All suggestions for changes in the Fiscal Regulations which seem desirable to employes of the Office of Cereal Investigations should be sent promptly to Mr. C. R. Ball, Cerealist in Charge:

MEMORANDUM FOR HEADS OF OFFICES.

Dear Sirs:

The Committee on Finance and Business Methods will consider a general revision of the Fiscal Regulations of this Department about September 1 of this year. I will be greatly obliged, therefore, if you will suggest any revision of the regulations that appear to you to be important in connection with the satisfactory handling of the work of your office, and forward these suggestions to the Chief of Bureau not later than August 15.

Very truly yours,

K. F. Kellerman, Associate Chief of Bureau

PROJECT REPORTS

218. CEREAL DISEASE INVESTIGATIONS.

(Dr. H. B. Humphrey, Pathologist in Charge.)

218-A. INVESTIGATIONS OF IMPERFECT AND SAC FUNGI.

(Dr. A. G. Johnson, Pathologist in Charge.)

(Corn Root and Ear Rots, in cooperation with Purdue University Agricultural Experiment Station, La Fayette, Ind. (G. N. Hoffer).

(Jan. 16.) During the past month, experimental plats for the study of the root and stalk rots of corn have been planted at the following places:-

Dent Corn: Battleground (2 plats); Linden, Frankfort, Wanatah, Bedford, Ft. Branch, Shelbyville, and Bluffton, Ind.

Sweet Corn: Hoopeston, Ill; Chillicothe, Ohio, and De Graff, Ohio; Columbus, Ind.; Grass Lake, and Rochester, Mich.; Ames, Iowa; and Columbus, Wis.

The dent corn plats are in charge of Messrs. J. F. Trost and B. H. Duddleston. Commercial varieties of corn are being used for these experiments. Of the two plats located near Battleground, Ind., one of four acres is for physiological and pathological studies, and the other of equal size is for the testing of relative resistances of the different strains of Reid Yellow Dent corn obtained from 30 different sources.

The Linden experimental plat is a fertilizer control plat. This plat is duplicated at Bedford, Ind. The Frankfort experimental plat is an exact duplicate of the Reid Yellow Dent strain test at Battleground, Ind.

At Wanatah, special breeding experiments are being conducted for the development of resistant strains of an early yellow dent corn.

The Ft. Branch Experiment is a continuation of last year's studies, Plantings have also been made here paralleling those at Bluffton and Shelbyville, Ind., Reid Yellow Dent corn being used.

The Shelbyville experiments have been conducted in cooperation with the Shelby County Farmers' Association. Extensive germination tests, using the modified rag doll, were made during the spring, and 25 bulk plantings, using diseased and apparently disease-free seed ears, have been planted. These experimental plats will give an estimate of the value of the germination test for apparently disease-free seed ears. In addition, an ear-row plat using Johnson County corn has been planted. This plat is for the special study of the pathological symptoms of the secondary rots of corn which are of much importance in this locality.

The sweet-corn projects are in charge of Mr. Glenn M. Smith. At Hoopeston, Ill., extensive experiments are in progress, using the Stowell Evergreen variety. Fertilizer and limestone treatments have been made to study their effects on the development of the pathological symptoms of disease. A varietal experiment involving the use of 20 varieties is also being conducted to determine relative resistance of the varieties to the root rots.

At Chillicothe, Ohio, in cooperation with the Sears & Nichols Canning Company, a large amount of work is in direct charge of Capt. J. W. Nelson. Experiments are in progress in order to determine the value of physical selection of seed ears and the effects of selecting seed ears from different types of stalks early in the fall. The varietal test, using the same varieties planted at DeGraff, Ohio, Hoopeston, Ill., and Ames, Iowa, is also being made.

The experimental plat at Columbus, Ind., is an ear-row experiment for the study of disease as it occurs in Stowell Evergreen and White Evergreen seed corn planted in that locality. Root rot was serious in this region last year.

The Jerome B. Rice Seed Company, at Grass Lake, Mich., germinated a large quantity of corn of 18 different varieties during the past winter. Many ear-row plantings have been made by Mr. George E. Starr, Manager of the experimental farm operated by this company at Grass Lake. Mr. Smith is cooperating with them and will study the diseases that develop in any of these varieties. Apparently disease-free seed ears only have been used in these plantings.

At Rochester, Mich., three ear-row experimental plats using Golden Bantam, Country Gentleman, and Stowells Evergreen sweet corn are planted at the Oakview Farm of the D. M. Ferry Seed Company. These plats are for the purpose of studying the pathological symptoms of the disease in the above varieties in this locality.

At De Graff, Ohio, the De Graff Canning Company has employed Mr. John Weghorst, who is in direct charge of the experiments at this place. A parallel varietal test for the study of relative resistances to the root rots has been planted by Mr. Weghorst, and Mr. Smith will cooperate in the work at this place.

At Ames, Iowa, in cooperation with the Truck-Crop Division of the Horticultural Department of the Iowa Agricultural Experiment Station, a parallel planting using the same varieties that have been planted at Chillicothe and De Graff, Ohio, and Hoopeston, Ill., has been planted. The work here is being done in cooperation with Prof. A. T. Erwin of the Horticultural Department.

At the present time, Mr. Smith is taking first readings on the varietal plat at Ames, Iowa, Mr. B. H. Duddleston is at Ft. Branch, Ind., and Mr. John F. Trost is at Linden, Ind.

ILLINOIS

Bloomington (J. R. Holbert).

I have been cooperating with Mr. Brunson of the Division of Planting Breeding of the University of Illinois, by making disease readings on the

ears that have been planted in his different breeding plats, particularly the high-yield and low-yield experiments. The samples were sent to me only after they had passed the careful selection to which they had been subjected ever since the experiment had been going. Of the forty ears, seven were absolutely disease-free and possessed extraordinary vigor. Three were almost 100 per cent infected with Diplodia and some Fusarium-like fungi. The rest were slightly diseased in one way or another. The material that was used for a composite check had been carefully selected and germinated but our disease reading showed it to be from 30 to 50 per cent infected. To quote from Mr. Brunson's letter:

"All of the rows were planted 3 kernels in a hill except the diseased class, which were planted 4 in a hill. We were very careful to make an accurate drop and by observing all possible precautions were able practically to eliminate any depredations by gophers, mice, and birds. I didn't notice a single hill on the plat which had been injured by animals or birds at the time the count was taken.

"The corn had rather severe germinating conditions and came up very slowly due to the cold weather in the two weeks subsequent to planting."

The average field stand is as follows:

Disease-free.....	93.3	per cent
Slightly diseased.....	90.0	" "
Badly diseased.....	66.0	" "
Check rows.....	84.9	" "

218-B. RUST INVESTIGATIONS

(Dr. H. B. Humphrey, Pathologist in Charge.)

BARBERRY ERADICATION CAMPAIGN

(F. E. Kempton, Pathologist in Charge.)

COLORADO

Agricultural College, Fort Collins (John R. Fitzsimmons)
May and June reports.

To date the work accomplished has been the rechecking of the city of Denver. Fifty-five plantings having sprouts have been located. Of these seven were infected. The letters sent out early in the spring calling attention to danger from sprouting barberries have helped a great deal in locating and eradicating sprouts.

ILLINOIS

State Entomology Building, Urbana (L. R. Tehon).

During the month of June, barberry eradication in Illinois has gone forward satisfactorily. Not many barberries have been found, but we feel that the small number found indicates that our task will not prove as hard as that of many other States. Two men and an automobile have been employed throughout the greater part of the month. About Dixon there were indications of scattered escaped barberries when we had worked the town the year previously. Dixon is located on the banks of the Rock River. A few escaped barberries have been found in the country, and also a very few tame plantings have been found to be still in existence outside of the town. Approximately three townships were covered by these two men in about ten days. The average daily run is from forty to fifty miles, depending on the conditions of the roads and the number of barberries found. Another squad and automobile are ready to begin work immediately on the first of July. It is planned to start these men somewhere along the northern boundary of the State to further a cooperative arrangement with the State of Wisconsin. We will then clean up a strip along the northern boundary of Illinois and we hope that the State of Wisconsin will be able to do the same thing on their side. This strip will then be steadily widened year after year until the State will be entirely cleaned up.

INDIANA

Purdue University Agricultural Experiment Station, LaFayette
(R. J. Hosmer). May and June reports.

May. A total of 6 plantings was found. Two of the country plantings were slightly infected. Heavy infections were found on two plantings near Knightstown, Henry County, on May 13. No wild plantings were found during the month.

June. Some rechecking was accomplished during which two new plantings were located in La Porte County, both free from infection. Miami County, of which Peru is the County Seat, was worked and proved to be rather free of barberries. Four plantings totaling 5 bushes were found in the county. Although all were in the country, none was infected. No outbreaks of black stem rust have been noted on any of the cereals. The county agent of Knox County reports, however, that there is a rather mild outbreak of black stem rust about 5 miles south of Vincennes. This is to be investigated.

IOWA

Iowa State College, Ames (Leighton L. Rhodes.)

No report.

MICHIGAN

Michigan Agricultural College, East Lansing (W. F. Reddy).

No report.

MINNESOTA

College of Agriculture, University Farm, St. Paul (Mark A. McCarty)
May report.

During the month of May over 4,000 bushes have been removed, 3,946 bushes of old and 75 bushes of new findings. Field work has been limited by the necessity of considerable office work in connection with securing men and automobiles for the summer drive. Our force is all set and waiting for the word "go" on July 1, when it is hoped their appointments will be effective, and they will be supplied with all the necessary equipment and materials for the campaign. The nature of the field work so far done in May has been follow-up work to get out bushes found last year that were for various causes left standing at the conclusion of our field work of 1919. What little new field work as has been done in rural communities indicates strongly that there are still many rural plantings of common barberry and this supports the conclusions we have already drawn. In May, 14 new rural plantings were found, and three of these were escaped bushes. Our first finding of infected barberry this year was at Buffalo Lake, Minnesota, on May 12. Since that date very nearly all the barberry found carries quite generous infection.

We have been getting some publicity this year, but our real work in publicity will start with the inauguration of our summer campaign. A story of approximately 2,000 words with photographs is appearing in the Northwestern Miller of June 9th, and the Hubbard Milling Company of Makato, Minnesota, is running an article on the common barberry in their house organ. Sentiment in favor of barberry eradication in Minnesota is very favorable. Everybody is with us, except perhaps a few skeptics and doubting "Thomases". County agents in two instances have reported directly to my office of the finding and destruction of barberry on rural property. They report the name of owner, number of bushes, and what disposition has been made of them. This cooperation is just an indication of the response we are able to get from county agents, even though they are "up to their necks" in work. A high

school superintendent has just recently sent in a report of barberry and has secured its destruction for me. The right spirit exists here in Minnesota and great things may be looked forward to in the way of field results this year.

June report. (Leonard W. Melander).

The work during June has been limited, due to a change in leadership. A total of 12 new plantings was reported, nine of which have been destroyed. Including plantings previously reported, 941 bushels were destroyed in Minnesota in June. Two field assistants were employed during the last few days of June. The prospects for a successful year are bright. The Minnesota field forces has been carefully selected, and with but one exception, are all experienced barberry scouts. The outstanding feature of the survey in June has been the prevalence of rust infection on the barberry. We have found no mature bushes which were not infected. One hedge of 32 bushes of the purple variety was so severely rusted that its growth was noticeably inhibited. Mr. H. D. Barker made a survey of Mankato, Waseca, Owatonna and Albert Lea in the hope that he could find some grain and grass infections directly traceable to barberry. At Mankato he found infection on Agropyron repens fifty feet from an infected hedge. A wheat field 300 yards east of a barberry hedge was found to be infected with stem rust but infection was light and scattered generally throughout the field. At Waseca, Albert Lea and Owatonna, he found no infection which could be traced directly to barberry. All the men are receiving instructions to push publicity. They are taking liberal supplies of posters and bulletins with them into southwestern Minnesota where our major field work is to be carried on. Cards reporting bushes or at least asking for bulletins are coming in every day. The nurseries are all being checked by nursery inspectors under the direction of the State Entomologist, A. G. Ruggles, who is very liberal with his cooperation and interest in the work. He has eight nursery inspectors out in the State. They will be able to furnish us some good survey reports. Mr. Ruggles was in Osakis, Moorhead, and Noyes (Northwestern Minnesota) recently but was unable to locate any bushes. He visited many wheat fields but saw no rust and heard of none being reported in that part of the State. July 1 is being looked forward to as a day on which the sparks will fly in our survey. The "clutch" is to be thrown in and "Full speed ahead" will be the order. All of the men have been "sharpening" their "barberry" eyes in xx preparation to see who will find the largest number of bushes.

MONTANA

Montana State College of Agricultural and Mechanics Arts, Bozeman (R. B. Streets). May and June reports.

The task of eradicating common barberry in Montana is progressing according to schedule, although considerably hampered thus far by road and weather conditions.

The southern district (southeastern third of State) was completed June 15, and, unless some unforeseen circumstances prevent, the Northern district (northern third) will be completed about July first.

This leaves the Western district which should be completed by August first. About that date the wheat rust may be expected to appear in the irrigated districts, and we believe it would be well worth while to devote the month of August to gathering data on the prevalence of stem rust in Montana.

During the present season, attention has been particularly directed to securing the total eradication of all sprouts from plantings removed last year. The larger bushes, especially if not dug deeply, very often sprouted and plantings were found in which a large percentage of the bushes had made a new growth of over two feet after being removed last summer.

A circular letter was addressed to each property holder on whose premises barberry was found, calling his attention to the fact that the sprouts were just as serious a menace as the original bushes, and suggesting that they be removed before the field men called upon him to check up the total eradication of the bushes. The freshly stirred earth where barberries had been would indicate that the suggestion was taken in many cases.

No wild barberries have been found, and only one new planting (six bushes common green barberry) has been found.

The means of publicity and education previously used have been continued.

NEBRASKA

College of Agriculture of the University of Nebraska, Lincoln (James A. Faris). June report.

The follow-up work on barberry locations of last year continued to show a large per cent of the bushes removed. Ninety-five per cent of the bushes located in the rural districts have been destroyed. About five per cent merely had been cut off and were sprouting again. These sprouts were removed in practically every case by the field men.

The rust has developed very rapidly since the first of June. At the beginning of June the rust was limited to the immediate vicinity of rusted barberry bushes. This condition continued until about the middle of the month. On June 18, stem rust was pretty generally present in very slight amounts on the winter wheat in the southeastern part of the state.

A very striking case of the spread of the rust from barberry to the wild grasses and winter wheat in the immediate neighborhood was found about 12 miles south of Hastings, Nebraska. The first observation was made on Friday, June 11, when the rust had spread to the grasses and to the winter wheat near by. On June 18, one week later, the western wheatgrass, Agropyron smithii was badly rusted for a distance of 300 feet south and west of the hedge while at a distance of 50 to 100 feet east of the hedge this same grass showed no trace of the rust. Hordeum pusillum was rusted for a distance of 400 feet from the hedge and the Hordeum jubatum was found rusted for a distance of one-half mile from the hedge. These latter two grasses are not generally rusted at the present time in this section of the state. In fact, it is rather striking that the rust on these wild grasses is more

or less localized near barberry while the rust on the winter wheat, at the present time, has become fairly generally distributed. No spring wheat was grown in the vicinity of this hedge during the present year.

NORTH DAKOTA

North Dakota Agricultural College, Agricultural College (George C. Maycue). June report.

Twenty-one plantings of barberry consisting of 98 bushes were located during June. Ten plantings, or 42 bushes, were located in rural districts. Four of the plantings found in rural districts were first reported through our publicity campaign which was carried on during the winter months.

A barberry eradication exhibit was put on at the Stutsman County Fair, at Jamestown, N. D., June 24 to 26, inclusive. A booth in the Agricultural Building was devoted entirely to our exhibit, which consisted of common and purple barberry plants, posters, and many maps showing the work which has been accomplished during the past season. The exhibit was put up in a neat, attractive way, which drew the attention of a great many people. 371 people stopped at the booth and asked questions about the relation of the barberry to black stem rust on wheat and other information regarding our work in general.

Three Barberry Eradication Clubs were organized among the school children of Richland County.

Uredospores of rust on Marquis wheat were found at Fargo, N. D., June 23, and on "Velvet Chaff" wheat at Jamestown, N. D., June 26.

OHIO

College of Agriculture of Ohio State University, Columbus (J. W. Baringer). No report.

SOUTH DAKOTA

South Dakota College of Agriculture, Brookings (H. C. Gilbert).

We have had considerable rain lately but it is clearing to-day so that we will probably be able to get into the field to-morrow or July 1. We are using these first few days to acquaint the men with the work and the fiscal regulations. The prospects for a running start July 1 and a good field season are fine now except for the conditions of the roads. A good many cross roads and those which are little used may be muddy and rough for a week or so.

So far this year we have located eight rural plantings of barberries in eight different counties in our regular survey work. Beginning July 1, all field men will work in one county until that is completed and then move to the next.

WISCONSIN

College of Agriculture of the University of Wisconsin, Madison. (Noel F. Thompson). No report.

WYOMING

College of Agriculture, University of Wyoming, Laramie. No report.

LEAF RUST INVESTIGATIONS (H. S. Jackson and E. B. Mains).

Heteroecious culture studies of leaf rusts have been brought to a close by the hot weather. Although it is still possible to obtain infections, the high temperature of the greenhouse usually prevents the formation of aecia. The culture work of this spring has been especially successful. About 174 telial collections were used with success in 106 cases. The successful results have added a number of new connections of special interest and have confirmed previous work. Many new hosts have been used and we have been able to determine the host range in a number of cases. From the aecia thus obtained a number of sowings have been made back upon grasses and such cultures are now being used to determine the host range for the various races which were differentiated by the aecial hosts.

Dry weather has interfered with the development of the grass garden. The transplanting of grasses in the garden was followed by a period of dry, hot weather. However, most of the grasses were able to establish and maintain themselves and recent rains have considerably relieved the situation. The garden can now be watered by a portable Skinner irrigating line so that no difficulty is anticipated in maintaining the new grasses throughout the summer

Reports of the behavior of resistant wheat varieties in the south, together with specimens, have been received from Dr. C. A. Ludwig, Clemson College, S. C.; Prof. F. A. Wolf, West Raleigh, N. C.; Prof. R. R. Childs, Athens, Ga.; Mr. A. F. Thiel, Auburn, Ala.; and Prof. C. W. Edgerton, Baton Rouge, La. These selections have all been rather uniformly resistant to leaf rust and give promise of being useful varieties for breeding experiments.

Leaf rust notes have been taken on but one of the large sowings. These were taken by Messrs. E. Mardfin and Carl Kurtzweil at Knoxville, Tenn., where a rather heavy epidemic of leaf rust made possible the recording of some very interesting data.

Mr. E. Mardfin has resigned and left to take up other lines of work. Miss Florence Smith has been conducting part of the culture work and taking care of the collecting of material for herbarium specimens and seed. Miss Evelyn Allison has been assisting in summarizing and tabulating data. Mr. R. O. Cole has been carrying on most of the culture work with leaf rust of wheat since Mr. Mardfin left.

STRIPE RUST INVESTIGATIONS (C. E. Owens).

(May 31.) Dry weather continued throughout the month of May. The wheats in the rust nursery continued to make poor growth, appearing stunted and lacking in vigor.

Repeated attempts to induce a rust epidemic have been made. Various devices have been used, such as transplanting rusted plants from the green-

house to the nursery, spraying spores onto the plants, and making hand inoculations. Many slight infections have been secured, but it has been impossible thus far to induce the rust to spread over the nursery. Undoubtedly the cool, dry weather and the lack of luxuriant growth of the wheat plants account for this failure.

On May 6, stripe rust was found sporulating on Elymus glaucus at an overwintering station in the College Pathologium and along Oak Creek, west of the College Farm. On May 20, a heavy infection was found on an Australian wheat, C. I. No. 4719, in the Agronomy plats not far from the rust nursery. This plat is on the windward side of the rust nursery and it is possible that infection came from grasses to the windward of this plat rather than from the rusted plants set in the rust nursery. The nearest point at which the rust has been observed on grasses is that on Elymus glaucus a half mile to the westward (windward) and on Bromus marginatus, about one-fourth mile to the leeward. This Australian wheat was seeded earlier than the wheat in the rust nursery and is in a much more advanced and luxuriant state of growth, which may account for the heavier infection. It certainly could not have had any better opportunity to become infected than has the wheat in the nursery.

There is nothing new to report on the greenhouse studies. Since last fall over seventy varieties have been tested for susceptibility and resistance to the three potential strains which we have been carrying along during the past winter.

INVESTIGATIONS OF SMUTS.

(Dr. George M. Reed, Pathologist in Charge.)

LOOSE SMUT OF RYE

In addition to the rye heads containing loose smut which were reported in previous numbers of the Cereal Courier as having been found by Dr. Reed and Dr. Leighty, this disease has also been found at Arlington Farm by J. W. Taylor and V. F. Tapke. Dr. Reed and Prof. F. D. Fromme of the Virginia station found a head containing loose smut of rye on the experiment farm at Staunton, Va., and Dr. H. S. Jackson reports the finding of six heads in a plat of Rosen rye in the take-all rotation experiments at Wanatah, Ind., which he visited in company with Dr. A. G. Johnson June 17.

COOPERATIVE CEREAL DISEASE INVESTIGATIONS IN CALIFORNIA

The following statement by Prof. W. W. Mackie covers investigations of various cereal diseases, including rusts, smuts, and Helminthosporium:

W. W. Mackie completed the note taking of disease attack and agronomic behavior of each variety on all the substations in the State, where crops mature early, as follows:

Station.	Number of lots.					
	Wheat	Barley	Oats	Rye	Timothy	Redtop
El Centro, Imperial Co.	83	7	4	2	1	1
Calipatria, Imperial Co.	32	4	2	1	1	1
Riverside, Riverside Co.	60	8	2	1	1	1
Winchester, Riverside Co.	16	3	2	1	1	1
Escondido, San Diego Co.	56	6	4	1	1	1
Corcoran, Kings Co.	58	4	2	1	1	1
Burrel, Fresno Co.	117	8	2	6	1	1
Kearney Park, Fresno Co.	22	9	2	2	2	2
Dodgeland, Butte Co.	80	8	7	2	1	1
Chico, U.S.P.I.G., Butte Co.	-	660	-	-	-	-
Salinas, Monterey Co.	101	222	207	1	1	1
Berkeley, Alameda Co. Oats	-	-	260	-	-	-
Leaf-rust plats	16	-	8	-	-	-
Breeding	250	16	2	6	1	1
Smut plats	120	-	-	-	-	-
Davis, Yolo Co.	-	788	-	-	-	-

The following substations are yet to be visited:

	Wheat	Barley	Oats	Rye	Timothy	Red Top
Loleta, Humboldt Co.	6	6	187	1	1	1
Eureka, Humboldt Co.	35	7	36	1	1	1
McArthur, Shasta Co.	26	3	1	1	1	1
Davis Creek, Modoc Co.	88	6	6	5	1	1
Davis, Yolo Co.	5,346	1,199	6	6	1	1

The smut experiments on barley at Salinas and barley and wheat at Davis are made in triplicate (2 smutted and 1 check). The number of rod rows of cereals under test for behavior toward various diseases and seed treatment include the following:-

Smuts	
Barley	2,517
Wheat	2,865
Wheat seed treatment	1,084
Rusts	1,821
Total	8,287

Mr. V. H. Florell, in charge of the cereal experiments at Chico, cooperated in taking the notes on Rhynchosporium at that station, Mr. F. N. Briggs, assigned to the cereal smut work, assisted in taking the records of the various diseases found in the Salinas plats.

The present crop year in California has been exceedingly dry, the rainfall being less than 50 per cent of normal over most of the State. This condition has prevented the appearance of rusts in epidemic form, although rusts in small amounts were found at all the substations.

At El Centro and Calipatria in the Imperial Valley, only a trace of stem and leaf rusts was found. On May 2 inspection showed that the harvest of barley had been in progress for a week.

At Riverside stem and leaf rusts were found attacking wheats and barley scald (Rhynchosporium) attacking barley. Stem rust was found on Lamarckia and Festuca grasses adjacent to the plats. Stem and crown rust was found on oats and leaf rust on barley and rye.

The Winchester plats showed stem rust on wheat and oats, leaf rust on rye, and scald on barley.

The Escondido plats showed vigorous growth, many of the wheats measuring 7 feet in height. Stem and leaf rusts were found on wheats; Helminthosporium and scald were seriously damaging barley; and stem rust and crown rust were present on oats and Septoria on wheat.

The plats at Corcoran were severely damaged by the drought. Scald and Helminthosporium severely damaged the barleys.

The Burrel plats on preirrigated land did not suffer from drought and were almost free of rust. Barley scald, however, was present.

The plats at Kearney Park where wheat follows wheat gave evidence of soil infestation from bunt where the seed had been thoroughly treated by standard methods. Little rust was found, but stripe disease (Helminthosporium gramineum), net blotch, and scald were noted on barley.

At Salinas, barley scald was prevalent with stem and crown rust on oats, heavy infections of stripe rust on wheat and on Hordeum murinum. Crown rust

on oats and Lolium and leaf rust on Bromus and Hordeum murinum were very common. No stem rust appeared on wheat, but the attack from stripe rust on certain wheats was exceedingly severe. All cereals will make excellent yields and further agronomic notes on yield, earliness, and shattering will be most valuable.

The Dodgeland plats were damaged by drought. The diseases found included barley scald, Helminthosporium "X", a trace of stem rust and leaf rust on wheat, and considerable stripe rust on Early Baart wheat.

The cereal plots at Chico were remarkably free from disease, no rust of any kind being found. Barley scald was universally present as well as traces of net blotch, stripe disease, and loose smut on Eastern barleys, Helminthosporium "X", and traces of bunt and of covered smut of barley.

The appearance of stripe rust on wheats at Salinas, Eureka, Hollister, Davis, and other points where stem rust is not found on wheat is interesting. Stripe rust in epidemic form was found at Salinas and Eureka on certain wheats.

The behavior of Hard Federation wheat, a promising newly introduced variety, under disease attack at various points illustrates the limited adaptation which may be anticipated for any single variety of wheat introduced in California. Hard Federation resisted drought well at all stations, producing usually three or four kernels per spikelet, as contrasted with the usual two kernels for most other varieties. At Riverside mildew and stem rust badly damaged it, while on the coast at Escondido, stem rust and Septoria singled out this variety for special attack. At Salinas it almost succumbed to attacks of stripe rust while common Federation alongside it was immune. At Davis where Hard Federation was infected by bunt almost all the plants were completely smutted.

Barley scald (Rhynchosporium) has been noted inall barley regions of the State, with losses amounting to one-third the crop in certain coastal areas.

F. N. Briggs began harvesting and counting the smutted barley plats at Davis on May 24. The percentage of smut infection is very low.

Hybridizing wheats to secure smut and rust-resistant varieties and barleys to produce varieties resistant to Rhynchosporium and shattering, is progressing at Berkeley.

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C E R E A L C O U R I E R

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(NOT FOR PUBLICATION)

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Personnel (July 1-10) and Field Station (June 15-30) Issue.

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PERSONNEL ITEMS

Robert W. Adams, who was appointed field assistant effective July 1, to assist with the barberry eradication campaign in Wisconsin, declined appointment, having accepted a permanent position elsewhere.

R. V. Allison, who was appointed for barberry work in Ohio effective July 1, declined appointment, having accepted another position.

Dr. Elmer D. Ball, head of the Department of Entomology and Zoology in the Iowa State College and Station and State Entomologist, has been appointed Assistant Secretary of Agriculture, effective June 12. Previous to his return to the Iowa State College, of which he is a graduate, he was State Entomologist of Wisconsin and for several years Director of the Utah Experiment Station. As Assistant Secretary he will devote his time principally to the scientific phases of the activities of the Department.

Alfred E. Bowman has been appointed Collaborator, effective July 1, to direct the barberry eradication campaign in Wyoming. Mr. Bowman is Director of Extension Work in Agriculture and Home Economics at the University of Wyoming.

Grant Cook, who received his Master's degree from the University of Wisconsin, has been appointed Field Assistant, effective July 9. Mr. Cook will assist with the barberry eradication campaign in Wisconsin and adjacent states.

Nina G. Cook was appointed stenographer and typist at East Lansing, Michigan, effective July 10, to assist with the clerical part of the barberry eradication campaign.

Prof. G. H. Coons, who has been acting as State leader in the barberry eradication campaign in Michigan during the past two years, has been appointed Field Assistant for one month beginning July 19, under which appointment he will conduct field work in connection with the campaign.

Raymond F. Crawford, a graduate of Iowa State College, has been appointed Field Assistant, effective July 1, to assist with the barberry eradication campaign in Iowa and surrounding states. From November 1 to February 28, 1919, and from August 1 to September 1919, Mr. Crawford assisted with the barberry eradication campaign.

Henry T. Darlington, Collaborator in barberry eradication in Michigan since June 1, 1919, resigned on June 30.

Jesse G. Fisher has been appointed teamster at the Aberdeen Substation, Aberdeen, Idaho, effective July 10.

Raymond Fogelman was reinstated on July 1, 1920, and has been assigned to the stem rust investigations conducted cooperatively with the State of Minnesota. Mr. Fogelman, who received his B. S. degree from Cornell University, was under appointment in the Office from December 28, 1918, to October 31, 1919, when he resigned to do graduate work at the University of Minnesota.

Watson E. Fowle, has been appointed Field Assistant, effective July 1, to assist with barberry eradication in Michigan. He received his B.S. degree from Michigan Agricultural College, in June, this year.

James R. Halliburton, a graduate of the University of Missouri, was appointed Field Assistant, on July 1, for barberry eradication in Iowa. Mr. Halliburton was discharged from the U. S. Army in December, 1918, having served as 2nd Lieutenant throughout the war.

Richard L. Harrison has been appointed unskilled laborer effective July 16, in connection with the flax experiments at Mandan, North Dakota.

C. P. Hartley returned on July 2 from a trip to points in New York, Massachusetts, New Hampshire and Ohio, where he inspected experimental corn plats.

John F. Holmes, who was under appointment in this Office from April 15 to June 30, 1918, and from May 8 to October 31, 1919, has been appointed field assistant, effective July 1, for service with the barberry eradication campaign in Indiana. He received the B.S. degree from Purdue University in April, 1918.

John S. Holmes, who received his B. S. degree from Tarkio (Missouri) College, has been appointed Field Assistant, effective July 1. He will assist with barberry eradication in Iowa.

Albert W. Keech has been appointed Field Assistant on the barberry eradication campaign in Nebraska. The appointment is effective July 10. Mr. Keech has studied three years at the College of Agriculture, University of Nebraska. He was discharged from the U. S. Army in April, 1919.

Emil H. Ostrom has been appointed Field Assistant, effective July 1, to assist with the barberry eradication campaign in Minnesota.

Rupert H. Porter has been appointed field assistant, effective July 1, to take charge of the barberry eradication campaign in Iowa, filling the vacancy caused by the resignation of Leighton L. Rhodes, the former State leader. Mr. Porter is a graduate of Iowa State College and is now extension plant pathologist there.

J. Milford Raeder has been appointed field assistant to assist with the barberry eradication campaign in Iowa, effective July 1. Mr. Raeder received the B. S. degree from Iowa State College. He was under appointment in this Office through March, April and May, 1918, as Field Assistant.

Harry P. Ridgon, a graduate of the University of Nebraska, was appointed field assistant, effective July 1, for the barberry eradication campaign in Nebraska. He has practically completed the work necessary for his M. S. degree and assisted for some time at the University of Nebraska in plant pathology.

Dr. George M. Reed, in charge of smut investigations, left Washington, D. C., on July 4, to inspect field experiments in the middle west. He went direct to Granite City, Illinois, where he will complete preparations for the disinfection of the wheat thrashed from the fields within the area quarantined by the State Department of Agriculture on account of flag smut and take-all.

James Sazama, who was under appointment in this Office through July and August last year, has been appointed field assistant, effective July 1, for barberry eradication in Wisconsin. He received the B. S. degree from Wisconsin College of Agriculture in 1916.

George R. Schroll was appointed field assistant, effective July 1, to assist with the barberry eradication campaign in Nebraska. He has studied two years at the Kansas State Agricultural College.

Ernest R. Schuls who was under appointment in this Office from July 1 to December 24, 1919, has been appointed field assistant, effective July 1, to assist with the barberry eradication campaign in Wisconsin. He received his B. S. degree in 1916, his M. S. degree in 1917 and his Doctor's degree in 1919, all from the University of Illinois.

Howard W. Sechrist was appointed field assistant, effective July 1, to assist in the barberry eradication campaign in Iowa. Mr. Sechrist received the A. B. degree from Grinnell College in June this year.

William R. Sempill was appointed agent, effective July 1, to assist Professor H. S. Jackson with the cooperative rust investigations being conducted at the Indiana Agricultural Experiment Station at LaFayette, Indiana.

Harry C. Stoll was appointed field assistant, effective July 1, to help in the barberry eradication campaign in Wisconsin. Mr. Stoll has done two years' work at Milwaukee County School of Agriculture.

Victor F. Tapke left Washington on May 30 and returned to Washington on July 2, visiting Indiana for the purpose of checking up results of the hot water treatment of seed wheat for loose-smut control. This hot-water treatment was applied during the fall of 1919 in approximately 40 counties in Indiana and very satisfactory results have been secured.

C. W. Warburton left Washington July 4 for Columbia, Mo., Manhattan and Hays, Kansas, to inspect cereal experiments; then to Ames, Iowa, to study extensive oat classification and breeding nursery there; from Ames Mr. Warburton will visit experiment stations in the western states.

VISITORS

Mr. A. G. G. Ellis, Agricultural Inspector of the Federated Malay States, who is in this country to investigate American methods of growing rice and raising livestock, was an Office visitor on July 9.

Capt. George A. C. Hearsey, 2d Lancers, Indian Army Reserve, who is now returning to India after several years' service in France, was an Office visitor on July 2. Capt. Hearsey is making a tour of the United States studying American Agriculture with a view to adoption of American methods of farming on his large estate at Patia, Kalan Station, United Provinces, India.

Dean Thomas F. Hunt of the College of Agriculture, University of Colorado, has been a visitor at the Office several times recently in connection with the revision of his textbook "Cereals in America." He sails on July 14 for England where he will spend most of his sabbatical year of leave. His headquarters will be at Cambridge.

PUBLICATIONS.

Galley proof of Farmers' Bulletin 882, entitled "Experiments with Flax on Breaking" by Charles H. Clark, formerly in charge of flax investigations in this Office, was read on July 1.

Page proof on the first paper in the series on kernel development in barley, by Dr. Harry V. Harlan, entitled "The Daily Development of Kernels of Hannchen Barley from Flowering to Maturity at Aberdeen, Idaho", was read on July 9. This paper will appear in the Journal of Agricultural Research for August 2.

Galley proof of Farmers' Bulletin 553 revised, entitled "Popcorn for the Home", by C. P. Hartley and J. G. Willier, was read on July 6.

Galley proof of the paper entitled "Genetics of Rust Resistance in Crosses of Varieties of Triticum Vulgare with Varieties of T. Durum and T. Dicoccum," by H. K. Hayes, John H. Parker and Carl Kurtzweil, was read on July 9. The paper is scheduled to appear in the Journal of Agricultural Research, on September 1.

Reprints have been received of the paper entitled "Rust in Seed Wheat and its Relation to Seedling Infection," by Charles W. Dungerford, which appeared in the Journal of Agricultural Research, issue of June 15. It contains 20 pages of text and 11 plates.

Galley proof for Farmers' Bulletin 1149, entitled "Growing Corn in the Southeastern States", by Curtis H. Kyle, was read on July 10.

Galley proof of Farmers' Bulletin 1162, entitled "Proso or Hog Millet", by John H. Martin, was read on July 6.

Galley proof of Farmers Bulletin 1147, entitled "Milo, a valuable Grain Crop", by Benton E. Rothgeb, was read on July 3.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). The fall army worm did some damage to rice in Louisiana last month. In many fields where the irrigation water had not been applied the rice plants were eaten down to the ground. The insect appeared in our fertilizer plats last week, but did very little damage. The station plats are in excellent condition with the exception of a few that are rather weedy. Irrigation water has been applied to all of them.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). All grain was harvested by June 16 and thrashing is now under way. Extremely dry weather just before harvest probably caused an early ripening of some of the later varieties of grain. Yields will be fair but not as good as last season. Yields of oats through the State are better than in the last four years. Very high yields are reported in the southern part of the State.

Thrashing was completed at the Tifton Substation on June 23. Yields of oats were very good, with fair yields of wheat. All late varieties of wheat had a severe infection of stem rust and the kernels are very light. Early varieties escaped injury.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). Wheat scab has been very light this year. The estimated damage is less than one per cent.

Bacterial root rot of field corn is causing considerable damage in some fields.

Septoria on wheat caused some damage on the early wheat and very much damage on the late wheat. Reports of one-hundred per cent infection came from Knox and Giles counties.

NORTH CAROLINA

State Experiment Station, West Raleigh, and Substations (G. M. Garren). No report. The cooperation in cereal experiments with the North Carolina Agricultural Experiment Station was terminated on June 30, because of reduced appropriations and no further reports will be received.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). No report.

NEW YORK

Cornell University Experiment Station, Ithaca (W. T. Craig). Weather conditions are more favorable here at present but the rainfall is still

below normal for this time of the year. Wheat is fully headed and the prospect is good for an average crop. Early oats are heading but are very short owing to the dry weather during May and the first part of June. The late oats will be short but if weather conditions continue favorable there are prospects of a fair crop.

The labeling of field plats has been complete in preparation for the Farmers' Field Days to be held here June 30 to July 2. It is expected that a large number of farmers in the State will take advantage of this opportunity to see the field experiments during the growing season.

The harvesting of the wheat hybrids in the greenhouse has been completed.

Dr. Love, who left here May 26 to take notes on and harvest the wheat hybrids grown at Chico, Cal., is expected to return here about July 4.

INDIANA

Indiana Agricultural Experiment Station, La Fayette (H. S. Jackson and E. B. Mains). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). Weather conditions in Missouri were quite favorable during the latter half of June. A week of cloudy, cool weather retarded the ripening of wheat somewhat and heads have filled out well. The yield will be larger than was expected two weeks ago. Harvest is well under way in the southern half of the State and is begun in the northern half. Oats harvest will follow shortly after wheat harvest. The condition of oats is fair considering the general late seeding.

On the station field the wheat harvest is completed except for the later varieties in the rod-row plots. The principal factor determining the yield of wheat varieties this season was winterkilling, largely due to the absence of a snow covering rather than extremely low temperature. Some of the hardy winter wheats produced at northern stations, such as Minhardi and Red Rock, were among the varieties most severely injured. The best yield apparently will be obtained from varieties of the Fultz type.

GREAT PLAINS AREA (South to North)

TEXAS

Amarillo Cereal Field Station, Amarillo (John F. Ross). No report. This field station has been closed effective June 30 on account of reduced

appropriations. The month of June was spent in shipping the farm machinery and laboratory and office equipment to other field stations. This work was practically completed at the end of the month. Mr. Ross will remain in the service during a part of July in order to complete the disposal of the property. After that, he will engage in grain inspection at Amarillo on his own account.

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). From June 17 to 22 a small quantity of rain fell each day, but since then the weather has been hot and dry, with some days comparatively windy for this time of the year. At present the sorghums are looking good but if present weather conditions continue for any length of time, crops will wilt during the day.

Dwarf milo seeded April 15 is making boot at present date, Feterita seeded May 1 is heading and Barchet kaoliang seeded May 1 is making boot. The sixth and last date-of-seeding plats were seeded to-day. The fifth date plats emerged to good stands on June 20 and 21. All of the sorghum plats have been hand thinned except the last two dates.

Wheat harvest is about three-fourths completed and yields apparently will be slightly more than last season.

The rainfall for the first six months of 1920 was 7.05 inches as compared with 11.85 inches, the average for twelve years, 1908 to 1919, inclusive. Maximum temperature for the last half of June was 104° on June 30; minimum was 53° on June 19. Precipitation during the last half of June was 1 inch, of which not more than .3 of an inch fell in any one shower.

KANSAS

State Experiment Station, Manhattan (John H. Parker). May. Weather during the first week in May was cool and cloudy and during the second week there were general rains with normal temperature. The third week was cool with good rains in some parts of the state, and the fourth week the temperature was a little above normal, with rain in some sections of the state.

June. During the first week, there were rains in most parts of the state and many stations reported temperatures of 90° or over. During the middle of the month, temperatures were abnormally high, causing the wheat to ripen prematurely and cutting down the yield of oats to some extent. During the third week there were rather heavy rains in western Kansas. The first half of the week was hot but the weather turned cool and was more favorable for the normal maturing of small grains during the second half of the week. Grasshoppers and Hessian fly were reported from the western part of the State. During the fourth week, there were good rains in northeastern Kansas and in the Kaw Valley, and in the western third of the State. Many of the central counties, however, remained dry. Cool weather prevailed during the first part of the week, but high temperatures prevailed during the last half of the week. Wheat harvest was more than half completed in the southern counties and oats were being cut.

At Manhattan during May, the lowest temperature was 40° on May 1 and 14, while the highest temperature, 86°, occurred on May 26 and 27. There was

measurable precipitation on seven days of the month, totaling 2.2 inches. During June the lowest temperature was 40° on the 5th., while the highest temperature was 98° on the 13th and 30th. There was measurable precipitation on eight days of the month, totaling 2.1 inches.

The earliest wheats in the nursery began heading about May 25, and most of the hard wheats headed about the 31st. Clark's Black Hull is early as to date of heading, but does not mature any earlier than Kanred. Nebraska Hybrid No. 28 was ripe on June 19 and other varieties from June 22 to 26. Rosen rye is several days later than Kansas Common rye, which may account for its failure to yield under Kansas conditions. The winter x spring wheat hybrids which were spaced were later in heading and ripening but most of them have now been harvested.

Oats in the nursery began heading about June 10 and ripened from June 24 to 30. The straw was short and the yield will be light, due to the fact that the oat nursery had to be resown at a date later than normal seeding time.

The barley varieties in the nursery headed from May 31 to June 8 and ripened from June 23 to June 27. The two-row barleys are inferior, as usual at this station. The more promising varieties as to earliness and grain production this year seem to be Datami, C. I. No. 575, and Mariout, C. I. 261. Nursery harvest was completed on July 1 and threshing began on July 5. Three increase fields of Kansas Fulghum oat, 5275, Kan. No. 5179, were grown at the Agronomy Farm and the seed will be distributed to farmers in the spring of 1921, probably in ten-bushel lots. This variety looks very promising at the station and favorable reports are being received from the 24 counties where it was tested this season.

The field inspection of Kanred wheat has been completed and the results are now being tabulated and the pure seed list will be issued some time this month. More than 400 fields of Kanred wheat were inspected this year in all parts of the State, representing a total area of between 15,000 and 20,000 acres. Four men sent out from Manhattan did most of the inspection and the fee of $3.00 charged each grower will about cover the cost of the inspection campaign. The inspectors paid special attention to the presence of rye, soft wheat, other varieties of hard wheat, weeds, and smut. In many counties in the State, from a trace to rather high percentages of stinking smut were found. Growers are being urged to treat all Kanred seed wheat to be sown this fall and some of the larger growers in each county will probably treat all of their seed which is to be sold. Such a widespread and severe epidemic of stinking smut in Kansas has not been known for a good many years. It is thought that climatic conditions and late seeding made necessary by dry soil last fall favored the development of smut.

Prof. Parker spent June 26 at Lincoln, Nebraska, with Professors Burr and Kiesselbach, of the Agronomy Department. He spent June 28 and 29 in Jewell County, Kansas, inspecting fields of Kanred wheat.

Office visitors at the station during May and June were as follows: Mr. John H. Martin, May 27 and 28; Mr. J. Allen Clark on June 3, Dr. C. R. Ball on June 12, Dr. H. V. Harlan on June 17, and Dr. H. H. Love on May 30 and 31.

Fort Hays Branch Station, Hays (A. F. Swanson). We are now in the midst of the harvest and most of the cereal plats will be harvested by the end of the week. Barley will be much better than oats. All of the wheat filled welll and good yields are expected. Timely rains on June 18 greatly benefited the wheat, and barley but came too late for oats.

The sorghum stand has been thinned and counted. The second cultivation of the sorghums was completed June 26 and the crop is making satisfactory growth.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). (June 18). Weather conditions have changed for the better in northeastern Colorado. Prior to June 16, the soil was becoming very dry and baked. In many places the winter wheat had begun to burn and it looked as though our annual drought had begun. On June 16, a rain of 1.13 inches was received. On June 17,0.95 inch was recorded and on June 18, nearly 0.25 inch of rain fell. Winter wheat is practically headed and at the present time the prospects are for the best winter wheat crop produced in this section of the Great Plains since the record crop of 1915.

Corn planting was completed about June 1. Good stands were obtained in practically all fields of corn this spring. The corn is growing well and with the recent rains the conditions are very favorable.

Sorghum crops are growing well. The stands have been somewhat reduced by the recent precipitation, but as a whole the conditions are satisfactory. Alfalfa is in blossom. The first cutting was made on the station plats June 16.

Cereal crops on the various Cereal Investigations projects on the Akron Field Station are in excellent condition. Winter wheat in the varietal experiment and in the first seedings in the rate-and-date experiment is practically in full head. Prelude spring wheat is fully headed. Many of the other plats of spring wheat in the varietal experiment have started to head. In the winter and spring wheat nursery the earlier maturing varieties and selections have started to head.

The earlier varieties of spring oats and barley in both the field and nursery have headed. The later maturing varieties have not as yet fully headed.

The corn in the various Corn Investigations projects on the Station is growing well. The rain of June 16 was accompanied by some hail, and the damage done to the corn was quite severe. The leaves were badly shredded, but the stalks seemed to have been damaged only very slightly.

Sorghum, proso, millet, and buckwheat plats were sown early in the month. Excellent stands were secured in all plats but the recent heavy rains will possibly reduce the stands somewhat, as considerable washing resulted.

(June 30). The total precipitation recorded at Akron Field Station during June was 4.89 inches. This is nearly twice the normal precipitation

for the month at this station. The rain was comparatively free from hail and as it was well distributed little soil washing resulted, and the crops were kept in excellent growing conditions at all times.

Winter wheat prospects are the best they have been in this section in five years. It is very likely that the record crop of 1915, in this section of the Great Plains, will be equaled. Due to the unseasonable spring, very little spring grain was sown in northeastern Colorado this year, but the fields are looking excellent.

A large acreage of corn was planted in this part of Colorado this year. The corn is growing well and in many fields the stalks are nearly two feet high. Sorgo, sudan grass and other forage crops are growing well. The first cutting of alfalfa was unusually heavy and the second cutting is nearly a foot high in some fields.

Crops on Akron Field Station are in excellent condition. Winter wheat, in the field plats, is fully headed. Most of the winter wheat in the nursery is headed. The stands on both projects are very poor, and as a result the plants are slow and uneven in heading.

All of the early-maturing varieties of barley, oats and spring wheat are fully headed. The late maturing varieties are heading. Spring wheat prospects are especially bright. The spring nursery seedings are slightly more backward, from point of development, than the field plats. Practically all nursery rows are headed or are heading.

Cereal Investigations corn, sorghum and millet plats are growing well. The heavy rain the first of the period caused some soil washing which reduced the stands in the sorghum and millet plats.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). The temperature during the month of June has been very mild. The maximum, 88 degrees, occurred June 8 and the minimum, 34 degrees, occurred June 1. There were but 0.11 of an inch of precipitation during the first half of the month, but the last half received the unusually large amount of 4.05 inches. This is the greatest amount of precipitation in June during the 40 years in which records have been kept at Cheyenne. The heavy precipitation was accompanied by cyclonic atmospheric conditions. Two cyclones occurred June 24 about 7 miles east of the Experiment Farm. Close to the path of this storm it is reported that hail stones seven inches in circumference were measured. Another report stated that three hail stones weighed one pound. Reports of still larger ones have been made but in these cases no measurements were made.

On June 29 there was one funnel-shaped cloud projecting close to the earth not far from the farm to the northwest. This one broke without doing damage but a light hail and heavy rain followed. On June 18 there was a heavy hail storm which covered the ground to a depth of 2.5 inches. The total precipitation during the storm was 2.36 inches. Considerable damage was done to crops.

At present, the crops are looking well with the exception of winter

wheat and rye which were damaged by the hail. The first heads of winter wheat had just come from the boot and the winter rye was in full head when the storm on June 18 occurred. The heads were severely injured. The winter wheat is looking much better now and most varieties are in full head.

The farmers and ranchers are jubilant over the prospects for a good year The grass is equally as good as in 1918 and spring crops were so late that the hail, so far, has done no serious damage.

Sheridan Field Station, Sheridan (R. S. Towle). No report.

SOUTH DAKOTA

All Stations. No report. Owing to reduction of appropriations for the fiscal year beginning July 1, all cooperation in cereal investigations in South Dakota was terminated effective June 30 and no further reports will be received.

Professor M. J. Champlin, who became Extension Agronomist in South Dakota on April 1, remains on our rolls as a collaborator for any emergency service which may be required.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzel). Owing to the cool weather prevalent in the early part of the season, very little wilting in flax occurred until late. However, a few warm days put the wilt fungus on good footing and it is now in possession of the wilt nurseries and of fields where flax has been grown for a few years and susceptible varieties were sown.

Flax canker was first observed June 16, the type being the same as that prevalent last year, i.e., canker with which no parasitic organism is associated. Investigations conducted here show that excessive heating of the surface soil by the hot sun will injure the plants at the soil line and cause canker. A soil thermograph kept in the canker nursery registered a temperature of 120 degrees Fahrenheit lasting for a period of about 2 hours on June 13. This was the temperature of the first inch of the soil. Soon after this period it was noticed that from 10 to 45 per cent of the plants in the nursery were severely cankered, the number depending upon the various controlling factors, such as age of plants, rate of seeding, shade, etc. In the fields outside the nursery some damage was done at this time though a considerable amount of the flax was older and past the stage in development when injury occurs. It is noted that no canker has appeared at the Mandan Station, 200 miles west. This appears to be due to prevailing low temperatures, the surface soil having at no time reached such a high temperature as that recorded at Fargo.

Flax rust (Melampsora lini) appeared June 7. Some varieties are more severely attacked than others though none is suffering much injury yet.

Some varieties in the wheat and oat rust nurseries have headed and others are almost ready to head. All are making rapid growth, owing to recent rains. There are traces of both stem and leaf rust in the wheat.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.). During the last half of June we have had good rains which came just in time to be of real benefit, especially to the late crops.

Flax sown April 15 is fully headed. All wheat and barley varieties and Sixty Day oats in the replicated varietal plats are fully headed.

Mr. W. E. Brentzel was here June 23 and 24 taking notes on flax disease seedings and sowing more material for disease studies.

The appointment of Mr. R. L. Harrison, first year student at Purdue University, to assist with the cereal investigations at Mandan during the summer months, has been requested.

Maximum temperature for the last half of June was 88°, recorded June 27; minimum, 46°, recorded June 18 and 19. Precipitation for the last half of June was 1.46 inches, making the total precipitation for June 1.85 inches.

Dickinson Substation, Dickinson (Ralph W. Smith). Crop conditions have improved considerably during the past two weeks, due to frequent rains. On June 16 there was a rain of 1.12 inches which was duplicated by another with the same amount on June 25. This makes a total of 4.06 inches for the month, which is more than an inch above normal for June.

During most of the month it has been cool with much cloudy weather. As a result corn is rather backward but other cereals are in excellent condition although rather weedy in places. Russian thistles, which became numerous during the past dry seasons, are now being held in check.

Early varieties of wheat, oats and barley are heading. The flax varieties and increase plats of flax look unusually well. The flax acreage in this section is small this year.

The nursery has been cultivated and hoed twice, and the alleys between plats cultivated three times. Director Trowbridge visited the station during the past week.

Mr. Oakley and Mr. Westover from the Office of Forage Crop Investigations are visitors at the Substation to-day.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). The weather has been very favorable for the growth of crops the last few days. Winter rye is now blooming and winter wheat is in the booting stage. All spring cereals are growing very rapidly and are now about six inches high. The prospects at present are for a large crop this fall.

Of the varieties of winter wheat in the replicated plats, Kharkov Selection, C. I. 1583-30, still leads all others in amount of growth, but in a much less degree than reported a month ago. Minhardi, C. I. 5149, Minturki, C. I. 6155, and Buffum No. 17, C. I. 3330 are showing up fine in about the order named.

This is a very busy time here now. We finished hoe trimming all of the plats yesterday and the roadways remain yet to be graded; the plat alleys are

to be cleaned; the row crops and trees to plow; the summer fallowing is just started; and the alfalfa will soon be ready to cut. Weeds are growing very rapidly which will necessitate a great deal of work before our annual picnic on July 29.

The precipitation during June was 3.97 inches which is 0.94 of an inch above the average for the last 22 years. The total precipitation for the first six months of the year is 14.00 inches which is only 2.52 inches less than the average of the entire year for the past 22 years. Precipitation was recorded on 21 days of the month and on every day from the 10th to 19th.

Temperatures have averaged above normal for the month. The maximum temperature was 79° on the 7th and the minimum 31° on the 2nd. The highest temperature we have had so far this year was 84° on May 28.

Mr. R. B. Streets, in charge of barberry eradication in Montana, and stationed at Bozeman, Montana, visited here June 30. Mr. N. F. Woodward of the Forage Crop Investigations arrived last evening from Havre, Montana.

WESTERN BASIN AND COAST AREAS
(South to North and West).

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). On June 1, wheat on the Levan Ridge gave promise of a 300,000 bushel crop, but during the last 30 days the condition of this cereal has had a decided drop from an estimated average acre yield of 25 bushels to about 17 bushels. The reason for this sudden change is lack of precipitation. With the exception of a few small showers which have amounted to 0.68 of an inch, no rains of any value to the growing wheat have occurred since May 22. Most of the grain is now headed and from present indications the earliest fall sowings will produce the highest yields. The daily temperatures during June have been unusually low. The maximum for the month was 91 degrees while former years have brought from 95 to 101 degrees before July 1. This moderate weather, if continued, will be a favorable factor in producing grain of good quality.

On the station all winter cereals are fully headed and the spring grains are beginning to head. From present indications several plat yields will be over 30 bushels per acre and the large increase field of Turkey will yield nearly 25 bushels. In the varietal experiment, Clark's Black Chaff is most promising. Potatoes, corn, and peas in the varietal and rotation experiments are making favorable growth. Alfalfa in the rotations has been cut and yields were near one ton per acre.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). The new farm is looking good right now. We will have a very good alfalfa stand all over the old dry farm, or in other words our new farm. We have been running water on this land night and day for the past 6 weeks and it is getting fairly well wet up.

OREGON

Harney Branch Station, Burns (Obil Shattuck). No report. Owing to reduced appropriations the cooperation in cereal experiments at this substation has been terminated, effective June 30, and no further reports will be received.

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman Co. Branch Station, Moro (D. E. Stephens). Our season is nearly two weeks later than usual and our grains will not be ripe until after July 15. The weather for June has been favorable and crop prospects in this County are good. The county as a whole will raise much more wheat than last year. Winter wheat in the vicinity of Moro will probably yield in excess of 30 bushels per acre. Much of the early-sown winter wheat is now far enough along so that it will not be injured by hot weather. Spring wheats are just heading, with prospects for higher yields than normal. Spring barleys are also looking fine. I expect a visit from Dr. Harlan next week.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). We are holding our annual demonstration day on June 30. President Holland of the State College and Director Johnson of the Experiment Station are to be on our program. Crop conditions are more favorable than we had expected to have them for this event.

In general, crop conditions are better than had been expected from early season indications. Grain has tillered very heavily as compared with recent years and, despite much wireworm activity early in the season, stands are mostly satisfactory. Our winter grains are poor, due to heavy winterkilling, and also are very late. Spring grains are fair, just slightly below normal, at least as good in most cases as last year.

Of all varieties of winter grain, other than rye, a hybrid wheat, C. I. 6467, Wash. 1093, was most winter hardy. In fact it was the only one coming through with a satisfactory stand. It is good in all three replications. It is a Crimean in type, being a hybrid of Jones Fife x Turkey Red selected to the Crimean type. In the nursery it Turkey Red x Bluestem has seemed in every way the equal of Turkey Red in all respects and superior in winter hardiness.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). Rice at the station does not seem to be growing very fast, especially on old land, although fairly good rice weather prevailed during the last 10 days.

Dr. Love of Cornell, Dr. Harlan, J. A. Clark and John Martin of the Office of Cereal Investigations were visitors at the station last month.

Most of the rice fields on the eastern side of the Sacramento River are submerged. The shortage of water in the Sacramento is more apparent than in the Feather River. For this reason the losses to the rice farmers are likely to be heavy in the vicinity of Willows.

Agricultural Experiment Station, Berkeley (W. W. Mackie). No report.

Plant Introduction Station, Chico (V. H. Florell). No report.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION)

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Vol. 12. July 20, 1920. No. 16.
Personnel (July 11-20) and Field Station (July 1-15) Issue.

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SEMI-MONTHLY REPORTS.

The Courier goes to press on or just before the 10th, 20th, and last days of each month. The issue of the 10th includes reports from field stations for the last half of the preceding month. The issue of the 20th includes similar reports for the first half of the current month, while the issue of the 30th or 31st contains project reports.

Semi-monthly reports, therefore, are desired from all field stations. Please mail them on the 15th and last days of the month. Those from the Eastern United States naturally reach the Office first and, as they appear first in the order of publication, it gives a chance for editing and stenciling reports from the Eastern stations while those from the Middle West and the Far West are arriving.

A little cooperation on the part of the employees in the field will make it possible to send the Courier to press much more promptly than has been possible heretofore and thus enable the news to get back to the field stations before it is stale.

PERSONNEL ITEMS

Donald Brazie has been appointed field assistant for the barberry eradication campaign, effective July 17, and will serve in Iowa where he was employed in the same work last summer.

Ralph A. Carroll, who has been engaged on our cereal disease control campaigns during the past 2 summers, has been reappointed, effective July 16, to assist in the eradication of flag smut in Madison County, Illinois, with headquarters at Granite City.

Mrs. Judith M. Fishburn, who has been assisting Mr. Chambliss in the Rice Investigation project, transferred to the Bureau of Markets, effective July 16.

Miss Alice E. Flynn, who has been assisting Dr. Harlan in tabulating data on the development of the barley kernel, resigned effective July 20, to return to her former employment with a legal firm in Milwaukee, Wisconsin. She left the Office on July 14, taking annual leave until her resignation is effective.

J. M. Hammerly, in charge of the corn storage room and laboratory, has been dividing time during the past 10 days between vacation and moving into Wing 7 of Building F, between 6th and 7th Streets, near B St., N. W.

George W. Hood, who had been appointed field assistant in barberry eradication in Nebraska, was unable to report for duty and his appointment has been revoked.

Leo J. Krakover, formerly in charge of rust epidemiology studies in the northeast district, but who has been on leave without pay since April 1, on account of shortage of funds, has resigned, effective June 30, to accept a much more lucrative position with the Goodyear Rubber Company at Akron, Ohio.

C. H. Kyle, in charge of corn investigations in the Southeastern States, returned to Washington on July 15 for 2 or 3 weeks.

Prof. C. Larsen, Director of Extension at the South Dakota State College, has been appointed a collaborator in the barberry eradication campaign, effective July 16.

Dr. C. E. Leighty left Washington on July 16 to study results of cooperative wheat breeding investigations at Cornell Experiment Station, Ithaca, New York. He also will visit other parts of New York State to see the improved varieties of wheat and rye which are being grown and increased in various parts of the State.

H. H. McKinney, in charge of foot-rot (take-all) investigations, finished his work on the crop of 1920 at Granite City, Ill., about July 15. He will spend several days at Urbana, Ill., thrashing the wheat varieties grown there, and then return to Madison, Wisc., for the summer to study and record the data obtained.

Dr. George M. Reed, Pathologist in Charge of Smut Investigations, returned to Washington on July 15 from his trip to the Midwest, beginning July 4. On July 6 he attended a conference at Granite City, Illinois, on the flag smut situation. In the morning session, plans for controlling this disease were agreed upon by Mr. Adkins and Mr. Glenn of the Illinois State Department of Agriculture, Dr. Burlison and Prof. Flint of the University of Illinois, County Agent Haberkorn of Madison County, and Dr. Reed. In the

afternoon, a meeting was held with about 90 farmers in the infested area and the program for controlling flag smut was discussed in detail.

July 7 and 8 were spent at the Missouri Agricultural Experiment Station, Columbia, in conference with station officers and in examining oat smut experiments conducted cooperatively there. July 9 was occupied by an inspection of the cooperative experiments in oat and barley smuts at the Iowa Experiment Station, Ames, in company with P. Denton Joseph, who has been given temporary appointment to obtain records of these experiments. At both the Missouri and Iowa Stations the experiments are progressing well, the previously resistant varieties continuing relatively free from smut.

On July 10, the cooperative smut experiments at Wisconsin Experiment Station, Madison, were inspected and conference had with Miss Edith K. Seymour regarding the progress of the investigation.

July 12 and 13 were spent at Illinois University in conference with Dr. Burlison, Prof. Dungan, Mr. Glenn, and others, regarding the details of plans for the control of flag smut and a continuation of the investigation of this disease.

Benton E. Rothgeb, who has been in charge of investigations of grain sorghums and broomcorn, has transferred to the Bureau of Markets, effective July 1, to take charge of the investigation in connection with the establishing of Federal standards for grading sorghums in interstate commerce.

John H. Shaw, who has been an agent in our cooperative cereal disease investigations at the Wisconsin Experiment Station, has resigned, effective June 30, to accept a commercial position paying a much better salary.

Victor F. Tapke, Assistant Pathologist in Smut Investigations, left Washington on July 11 to meet Dr. Reed in Illinois where he will undertake the supervision of the control measures directed against flag smut and take-all in that State.

Homer B. Thompson, a student of the University of Nebraska, has been appointed a field assistant for barberry eradication in Nebraska, effective July 15.

MANUSCRIPTS AND PUBLICATIONS.

Galley proof of Farmers' Bulletin 1137, entitled "Grain Sorghums: How to Grow Them," by Benton E. Rothgeb, was read on July 12.

Page proof of Department Bulletin 877, entitled "Australian Wheat Varieties in the Pacific Coast Area," by J. Allen Clark, David E. Stephens, and Victor H. Florell, was read on July 13.

Page proof of the paper entitled "Development of Barley Kernels in Normal and Clipped Spikes and the Limitations of Awnless and Hooded Varieties," by Harry V. Harlan and Stephen Anthony, was read on July 13. This paper is scheduled to appear in the Journal of Agricultural Research issue of August 2.

Galley proof of the paper entitled "Occurrence of the Fixed Intermediate Hordeum Intermedium Haxtoni, in Crosses Between H. Vulgare Pallidum and H. Distichon Palmella" by Dr. Harry V. Harlan, Agronomist in Charge of Barley Investigations, and Dr. H. K. Hayes, Head of Section of Plant Breeding, Division of Agronomy and Farm Management of the Minnesota Agricultural Experiment Station, was read on July 14. This article is scheduled to appear in an early issue of the Journal of Agricultural Research.

The manuscript of a paper entitled "Seed Coat Injury and Viability of Wheat and Barley as Factors in Susceptibility to Molds and Fungicides," by Dr. Annie May Hurd, Assistant Pathologist, was submitted on July 13, with a view to publication as a professional paper in the series of Department bulletins.

Page proof of Farmers' Bulletin No. 553 revised entitled, "Popcorn For the Home", by C. P. Hartley and J. G. Willier, was read on July 17.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). The fall army worm appeared in our fertilizer plats about July 5, but did very little damage. Plats are in excellent condition, except a few that are weedyn

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). Thrashing of all varietal plats has been completed and the nursery is now being thrashed. Yields of the different varieties have not yet been computed. Many inquiries have been received in regard to Rosen rye in this State and a statement has just been written for the Georgia Extension News warning farmers against its use as the tests on the plats here show an average yield of only 12 bushels per acre during the last two years as compared with 31.9 bushels for Abruzzes rye in the same period.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). The thrashing of barley and oat plats and nursery rows has been completed. The severe winter-killing of oats and spring weather unfavorable to development of these two crops, but most favorable to the growth of weeds, especially the dog fennel, caused poor yields.

Wheat thrashing is now in progress and over half completed. Despite frequent showers since harvesting the grain is in excellent condition and is yielding high, some of the fortieth-acre plats yielding at the rate of 40 bu.

per acre. Damage done by sparrows to the grain while in shocks appears to be an important factor. Chief weather data are:

June		July 1--15	
Precipitation,	4.51 in.	Precipitation,	2.89 in.
Maximum temperature;	95°	Maximum temperature,	91°
Minimum "	50°	Minimum "	55°

Round Hill and Shenandoah Valley Section (C. E. Leighty). During July 4-6 I made a trip by auto from Washington to Round Hill and other points in Virginia east of the Blue Ridge and also into the Shenandoah Valley. At Round Hill I visited the farm of Thomas W. Best, to whom I had sent 10 bushels of Purple Straw wheat, C. I. 1915, last fall. This had produced a good crop under rather unfavorable conditions. Mr. Best was interested in absolutely pure seed, so I rogued enough of his wheat to thrash out sufficient seed for an acre. It contained not to exceed one per cent (1%) of mixture and practically no diseased heads. The seed had been treated in 1918 with hot water and the crop was almost entirely free of loose smut. Although grown on corn ground almost no scab was present. The entire crop, exclusive of that seeded by Mr. Best, had been spoken for by neighbors for seed.

Other varieties grown on the place from seed secured from a prominent seed-wheat dealer looked well, but were mixed as to variety 15 per cent or more. Head selections were made from one of these varieties to start him with pure seed.

The wheat in the Valley was especially good. The principal variety is Leap Prolific. Some Stoner and Fultz were seen.

Mr. O. M. Swimley, living near Swimley, Va., who is growing Fultz, C. I. 1923, also was visited . He has been growing the variety for 6 years from seed which I furnished to him. He had kept the variety at least 95% pure. The variety had equaled but not exceeded in yield that of other varieties grown in the neighborhood. A very good yield was in prospect this year. The wheat when seen stood in shock.

Most wheat was cut or cutting was being finished on July 5. Some few fields still remained standing. Harvest was unusually late this year, but yields promised to be comparatively high, with quality excellent if thrashing or mowing in barns is completed before damage occurs in shock.

Several photographs of wheat fields were secured on the trip. Head samples also were collected for sowing in head-rows this fall.

Very little stem rust was found anywhere on the trip.

NEW YORK:

Cornell University Experiment Station, Ithaca (~~xxxxxxxx~~). (C.E. Leighty) (July 17) Arrived here this morning. Wheat cutting just beginning on the College Farm. No wheat cut between here and Elmira. Prospects fair in this rather poor section. Wheat on Farm good.

All the men here are busy now, and Dr. Bussell has a thousand rows of

rye for me and him to cut next week, so it looks like I'd be busy soon. I'll be in the Hudson Valley but can be reached through the Plant Breeding Department here at any time.

(H. H. Love. July 19). H. H. Love and E. A. Southee have returned from their trip to Chico, California, made for the purpose of harvesting wheat hybrids. While on this trip they visited many experiment stations and discussed the cereal investigations under way. This afforded an excellent opportunity of gaining first-hand information as to the work being done at some fourteen different places.

The material at California came through in excellent shape and a lot of interesting hybrids were harvested. Segregations of various kinds were noted and the remaining material was shipped back to Ithaca for later study.

The work at Ithaca is progressing very well. The dry weather has been very hard on the oats so that the crop will be light, but from present indications the comparisons will be very valuable. At this time certain selections are showing up remarkably well.

Wheat and rye are now ripe and the harvest begins to-day. A large number of new hybrids and selections are showing up in a very promising manner and bid fair to be better than anything we have yet obtained. In the increase plats one of our selections which we expect to name this summer is showing up better than any of the other types.

Rye harvest in the eastern part of the State is now under way. Dr. C. E. Leighty and Dr. F. P. Bussell left on July 18 for Columbia and Albany Counties to hold field meetings and look after the harvesting.

An inspection trip through the wheat section will be made the latter part of the week of July 19 for the purpose of making selections and locating seed supplies.

INDIANA

Indiana Agricultural Experiment Station, La Fayette (H. S. Jackson and E. B. Mains). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). We have completed our harvest of wheat, barley, and the early varieties of oats. Several hundred rows of later varieties of oats remain to be cut. Threshing will begin the first of next week.

Over the State, as a whole, crops are in excellent condition, with the exception of a strip of counties along the Mississippi, south of St. Louis, in which drought threatens. The wheat harvest is completed throughout the State and threshing is begun in the Southern counties.

Mr. C. W. Warburton was an office visitor July 6, and inspected the experiment plots and laboratories of the Department.

GREAT PLAINS AREA (South to North).

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). (July 12). Thus far in July we have had an abundance of rainfall, also cooler weather. During the first 10 days, the sorghums have made the most rapid growth I have ever seen made.

The rain has interfered with cultivation and it is doubtful if another cultivation can be given most of the sorghums unless a one-horse implement is used. The sixth date-of-seeding plats emerged to good stands on July 5 and 6. The fifth date-of-seeding plats were thinned to stands this morning. Dwarf milo, feterita, Barchet kaoliang, and Red amber of the two earlier dates of seeding are starting to head.

Maximum temperature for July to date was 107° on July 1. The minimum temperature for the month to date was 58° on July 9. The precipitation for July to date was as follows: July 2, 0.73 ins. July 3, 1.56 ins., July 5, 0.21 ins., July 6, 0.91 ins., July 8, 0.28 ins.; July 9, 0.59 ins.; July 10, 0.16 ins.; and July 12, 0.10 ins, or a total of 4.54 inches for the first 12 days of the month.

I expect to leave on a trip to Dalhart, Texas, and Garden City, Kans., with Mr. Chilcott early in the morning. Mr. Osborn, Superintendent of the Lawton Field Station, is here and will take the trip with us.

KANSAS

State Experiment Station, Manhattan (John H. Parker). (July 17th). During the first week in July temperatures were above normal in many sections of the State. Several stations reported temperatures of 100 degrees or higher on several days. There were heavy rains in the northeastern and southeastern sections of the State. Wheat harvest was finished in the southeastern and southcentral counties and was well under way in the central part. Many of the combine harvester-threshers are being used and seem to be giving satisfaction.

During the second week in July there were soaking rains in the Kaw Valley and in the eastern counties. Wheat was nearly all cut except in the northwestern part where it is now being harvested. The yields of wheat in nearly all sections of the State are even better than expected and the quality and bushel weight are unusually high. Oats and barley also are turning out well for the most part although yields of oats in some counties were cut by the hot weather during June.

The maximum temperature at Manhattan during the first week of July was 98 degrees on July 4, and the minimum was 50 degrees on July 11. There has been a measurable amount of precipitation at Manhattan on only three days during the first two weeks in July, totaling only about 1 inch.

The threshing of nursery wheats will be completed on July 21. The machine will then be used in threshing the cooperative tests from different sections of the State before the oats and barley from the nursery are threshed Threshing of the wheat and oats from the varietal and cultural plots at the Agronomy Farm has been completed. The increase fields of Fulghum oats at the Agronomy Farm yielded much better than expected, one of them making a yield of 40 bushels per acre, in spite of very severe damage from hot weather during June.

Mr. C. W. Warburton spent July 7 and 8 at Manhattan. Professor J. R. Fain, Agronomist of the Georgia College of Agriculture, spent July 16 at Manhattan. He was particularly interested in locating seed of good Kansas-grown alfalfa for shipment to Georgia.

Fort Hays Branch Station, Hays (A. F. Swanson). Cooler weather with an inch-and-a-quarter rain the last two days has been a wonderful help to all row crops. Sorghums are making excellent growth. A few of the head rows of the F_3 generation of a cross between Red amber and Feterita are now heading. There is quite a range in the manner of growth of the plants in the different rows and this will no doubt be more apparent in a few weeks. It is planned to bag a large number of the heads.

Harvest is about over in this community. Threshing of the small grains on the Cereal project will be completed in another day. While all of the yields have not been computed, the yield of wheat will be from 25 to 37 bushels per acre. The best oat yield (a Burt variety) is 44.0 bushels, while the highest yield for barley is 32.4 bushels.

Mr. C. W. Warburton and Dean F. D. Farrell visited the Branch station on July 10.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). Weather conditions during the first part of July, have been very favorable in northeastern Colorado. During the entire period the weather has been dry and warm. Local showers have been received in different sections, but no general rains have occurred. A total of one-fifth inch of rainfall was recorded for the period at Akron Field Station. The highest temperature recorded during the first half of the month was 94 degrees on July 14.

The warm, dry weather has been very favorable to the growth of corn and forage crops and to the proper ripening of the cereal crops. Unless this section is visited by a hail storm within the next ten days, the largest wheat crop ever grown in north-eastern Colorado will be harvested. Many of the farmers are predicting that their wheat will yield better than twenty-five bushels to the acre. The farmers are very anxious to start harvesting as they do not care to risk having their crop ruined by hail. A severe hail storm is reported to have occurred near the Nebraska State line. The corn

and wheat were beaten into the ground. Most of the winter rye ggrown in this section has been harvested. While a few farmers have already started to cut winter wheat, harvest will not start generally before Monday, July 19.

The dry weather has caused the corn and forage crops to grow very rapidly. The corn in most fields is nearly waist high and is starting to tassel. The present corn crop prospects are very bright. Forage crops are growing well but are having a battle with the weeds in many fields.

Many gardens in this section are suffering from the ravages of the Harlequin cabbage-bugs. This is apparently the first time these insects have made their appearance in large enough numbers to be a problem. In many gardens bugs seem to be doing a great amount of damage. Finding a remedy for the pests is proving a problem.

Cereal crops on Akron Field Station are doubtless the best they have been in five years. Many of the winter wheats will yield about thirty bushels to the acre. The plats of spring wheat are very promising. Oats and barley plats are in excellent condition. It is very likely that many of the plats of oats will yield close to fifty bushels to the acre and that many of the barley plats will yield at least thirty bushels to the acre. All of the earlier varieties of oats and barley are ripening. The plats of Giant Winter rye and Arlington Awnless barley were harvested July 14. Burt oats, Blackhull barley, Nebraska Hybrid and Prelude Wheats will probably be harvested during the present week.

Winter wheat in the nursery has started to ripen. The stands in most of the rows are so poor that heading and ripening is taking place very unevenly, so unevenly in fact that the data are exceedingly difficult to get and will be of doubtful value.

Cereals in the spring nursery are all headed and many of the earlier maturing varieties and strains have started to ripen. A few rows of the Algerian wheat are exceptionally tall, being close to five feet in height.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). During the past fifteen days the weather has been quite favorable for crop production save for a slight hail which occurred July 7. The total precipitation was .69 of an inch. This amount is rather low for the fore part of July but as the precipitation for June was exceptionally high there has been no ill effects to crops. The temperature has been very mild, the maximum being 87 degrees and the minimum -3 degrees.

The farm work has consisted of cultivating the corn and the weeding of plats.

The annual Farmers' Round-Up was held July 14 at the station. The program was worked out in cooperation with the County Farm Bureau and the event was very successful, there being about 200 automobiles and an attendance of approximately 1,000 persons. The program consisted of going over the experimental field with a large group of interested farmers from various parts of Laramie County. They were especially interested in the winter wheat and

grasses grown. The tractor demonstration proved to be very instructive and considerable information was given the visitors concerning the dairy work at the station. Special interest was taken in the field of sunflowers which are to be used for silage for the dairy cows. An excellent exhibit was shown in domestic art and science. Prizes were awarded for the best entries in each of these lines. A lively and amusing program of sports was given in the afternoon followed by dancing in the evening. Every one declared it the most instructive and successful outing ever held in this district.

Sheridan Field Station, Sheridan (R. S. Towle). No report.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzell). No report.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.). As a result of the rains during the first half of July, prospects look somewhat brighter than they did before. One rain of over an inch gave the soil a good soaking.

Sixty Day oats and White Smyrna, Mariout and Coast barleys are nearly ripe. All other varieties of wheat, oats and barley are fully headed.

Pustules of red rust were observed to-day in the biologic-form wheat nursery on both common and durum wheats.

This is an exceptionally good fruit year. There are quantities of June berries, currants and gooseberries ripe now and there will be an abundant crop of edible plums, sand cherries and non-edible peaches and apricots.

Maximum temperature for the first half of July was 94°, recorded July 4 and 12; minimum, 50° recorded July 13; precipitation 1.61 inches.

Dickinson Substation, Dickinson (Ralph W. Smith). Crop conditions have continued to improve, due to the frequent rains, so that the crop prospect is better than in any year since 1915. Since the first of June rains have been frequent enough to supply the needs of the crops and the growth of straw is becoming quite rank. The total precipitation for June was 4.16 inches, and for the first 15 days of July, 2.16 inches.

Due to cool, cloudy weather, crops are rather backward in maturing, corn in particular being much later than last year. Most of the leading varieties of wheat, oats and barley are partly or fully headed. Weeds are quite numerous this year, due to abundant moisture and to the fact that the soil last year was too dry to germinate the weed seeds.

The latest rain on July 12, totaling 1.45 inches, was accompanied with a wind that caused some lodging of the grain, which has since straightened up considerably. Some hail was reported in districts not far distant.

Heavy dews at night followed by still, sultry weather, have developed possibilities for rust but, so far, only a trace of stem rust has been found on a few varieties of common wheat.

During the present month two parties of farmers from Beach, N. Dak., and Glendive, Mont., each accompanied by a county agent, have visited the Substation.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). No report.

WESTERN BASIN AND COAST AREAS
(South to North and West)

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). No report.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman Co. Branch Station, Moro (D. E. Stephens). No report.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). No report.

Plant Introduction Station, Chico (V. H. Florell). The thrashing has progressed very satisfactorily and will be completed to-morrow. Grain yields have been very good, notwithstanding the dry season. A report of the leading varieties will be given in the near future.

Station visitors in June (about the time of the Cereal Conference at Berkeley) were as follows: Professors C. C. Ruth and Gilmore of the Oregon Agricultural College, C. W. Hickory, and W. W. Mackie, of California University; Mr. D. E. Stephens of the Moro Branch Station, Moro, Oregon, and M. A. McCall of the Adams Branch Station, Lind, Washington. Dr. H. H. Love of Cornell University and Major Southee of Australia spent about two weeks at the Plant Introduction Garden following the Conference studying and harvesting Dr. Love's hybrid material. Messrs. Clark and Martin of this Office spent a little more than two weeks at Chico studying the Wheat Classification Nurseries.

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CEREAL COURIER

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION)

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Vol. 12. July 31, 1920. No. 17.
Personnel (July 21-31) and Project Issue.

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PERSONNEL ITEMS

F. A. Coffman, in charge of cereal experiments on the Akron Field Station, Akron, Colorado, was obliged to take Mrs. Coffman to Denver on July 25 for an immediate operation for appendicitis.

Ralph U. Cotter, who graduated from the Utah Agricultural College and later took post-graduate work there, has been appointed State leader of the barberry eradication campaign in Wyoming, effective July 21.

Charles E. Dodge has been appointed as Unskilled Laborer to assist Mr. J. H. Holbert at Bloomington, Ill., effective July 26, 1920. Mr. Dodge was assistant to Mr. Holbert from July 1, 1919, to December 31, 1919, at Bloomington.

James R. Halliburton, who was appointed for barberry eradication in Iowa, effective July 1, failed to report for duty and his appointment has been revoked.

Dr. George N. Hoffer, pathologist in charge of Investigation of Corn Rots, returned to his headquarters at the Indiana station on July 24, after investigating the occurrence of the corn rots in the field in Indiana, Ohio, Pennsylvania, and New York. Dr. Hoffer visited Washington recently for a conference on investigational problems and publications.

Prof. John M. Holzinger, of the Department of Botany, Winona State Normal School, Winona, Minn., who has helped in barberry eradication in that district

during the past two seasons, has been reappointed for service there and in adjacent Wisconsin, effective July 21, 1920.

Dr. H. B. Humphrey left Washington on July 21 for an inspection trip extending westward to the Pacific Coast. He spent July 24 and 25 at Granite City, Ill., becoming familiar with the work in operation to control flag smut and take-all. On leaving there, he visited the Minnesota and North Dakota Experiment Stations and the Northern Great Plains Field Station at Mandan, inspecting our cooperative investigations of rusts and flax diseases. From Mandan, he xi returned to the Iowa Experiment Station, from whence he will proceed westward. The addresses at which he may be reached during August are as follows:

August 1, Experiment Station, Manhattan, Kansas, Care J. H. Parker.

August 3, Denver, Colorado, Care Hotel Savoy.

August 7, Pullman, Wash., Care Prof. E. F. Gaines.

August 10, Yakima, Wash., Care E. E. Samson.

August 12, Moro, Ore., Care D. E. Stephens.

August 14, Corvallis, Oregon, Care Prof. H. P. Barss.

August 18, Medford, Oregon, Care P. J. Neff.

August 20, Biggs, Calif., Care Mr. Jenkin Jones.

August 21, Berkeley, Calif., Care Prof. W. W. Mackie, Hilgard Hall.

August 25, Los Angeles, Calif., Care Hotel Alexandria.

August 28, Crowley, La., Care Dr. W. H. Tisdale.

August 30, Knoxville, Tenn., Care Mr. Carl Kurtzweil, Experiment Station.

Sept. 1. Arrive Washington, D. C.

Dr. A. G. Johnson, in charge of the investigation of imperfect and sac fungi, and Mr. Charles S. Reddy, in charge of flax disease investigations, accompanied Dr. Humphrey to the Minnesota and North Dakota experiment stations and the Northern Great Plains Field Station at Mandan, N. Dak., beginning July 27. Dr. Johnson expects to reach Washington about August 3, and remain until Dr. Humphrey returns.

Edmund B. Lambert, who was appointed for barberry eradication in Minnesota, has declined our appointment, having already accepted a position with a private concern. His appointment has been revoked.

Elmer C. Loy, who graduated from Iowa State College last June, has been appointed field assistant in barberry eradication in Iowa, effective August 1. Mr. Loy spent twenty-two months in the army during the War.

Archibald Saunders, who has been employed as stenographer for the past year in the Office of Crop Physiology and Breeding Investigations, was transferred from that office to the Office of Cereal Investigations, effective July 26, and has been assigned to the Administrative Project.

John B. Sieglinger left Woodward on July 13 by auto in company with Supt. E. F. Chilcott of the Woodward Field Station for an inspection trip in the adjacent portions of Oklahoma, Texas, New Mexico, and Kansas. The portion of the trip from Dalhart, Texas, to Tucumcari, New Mexico, and return, was made by rail, the remainder by auto. Among the stations visited were Dalhart, Texas, Tucumcari, New Mexico, and Garden City, Kansas. He returned to Woodward on July 20. A report of crops and crop conditions will appear in a later issue.

T. R. Stanton, who left Washington July 11 to study and harvest the cooperative oat nursery at the Iowa Experiment Station, writes that he will leave Iowa on July 28 en route to the extensive oat experiments at the Aberdeen Substation, Aberdeen, Idaho, where he expects to arrive on August 6 and to remain for some time.

C. W. Warburton, who left Washington July 4, reports that at that time wheat harvest was just beginning in central Ohio and Indiana. Much of the wheat seen in Ohio was thin and uneven in ripening, but many good fields were passed from the Ohio line to Indianapolis. Between Indianapolis and St. Louis wheat generally was poor. Most of the corn was small and uneven but of good color and evidently growing rapidly. Oats looked to be average or better.

The Missouri Station was visited July 6, where an interesting day was spent with Doctor Etheridge and Mr. Stadler in going over the crop experiments in progress. Wheat was fair, though the stand on many fields was thin. Corn on the station was good, but much of that in the vicinity was very small. Marked improvement in crop conditions was noted between Columbia and Kansas City.

The Kaw Valley between Kansas City and Manhattan, Kansas, showed an excellent wheat crop already harvested and a fine prospect for corn. At Manhattan, wheat and oat yields were somewhat reduced by drought, but conditions for harvest were ideal and the quality was excellent. On July 10, corn was exceptionally well advanced and had not yet been injured by drought.

Between Manhattan and Hays, both corn and wheat are better than east of Manhattan, wheat in particular improving as one goes west. Harvest at Hays was practically complete on July 10, only an occasional volunteer field remaining uncut. Many volunteer fields will produce good yields, though damage by Hessian fly was common. Considerable rust developed on late volunteer wheat, but too late to cause much damage. Crops on the experiment farm were good and some very interesting work is in progress, especially that with sorghums.

At the Iowa station (Ames), harvest of winter wheat was delayed by frequent showers during the first two weeks in July, but was completed without loss July 16. Yields of 40 bushels per acre or better are expected. Harvest of early oats began about July 15, and much of this crop is now in

shock. Hot, dry weather early in June, following the wet, late spring, caused early oats to head with very short straw and yields will be below normal. Later varieties were benefited by early July rains, but have rusted badly. Favorable weather has enabled corn to recover from the effects of late planting in cold, wet soil in May and the crop is now above normal, especially in the western half of the State.

Mr. Warburton's addresses for the next few weeks are as follows:

August 3 - 5, Care D. E. Stephens, Moro, Oreg.
August 6 - 7, Spokane Hotel, Spokane, Wash.
August 8 - 10, Hotel Moscow, Moscow, Idaho.
August 11 - 20, or later. Aberdeen Substation, Aberdeen, Idaho.

J. T. Wilcox, a graduate of Ohio State University in 1918, has been appointed field assistant for the barberry eradication campaign in Ohio, effective August 1. During the War, he held the rank of second lieutenant.

VISITORS.

Mrs. Ralph H. Brown, formerly Miss T. Enid King of this Office, was a visitor in Mid-July while on her honeymoon. Her future home will be in Cincinnati.

Taylor Grandy, of N. G. Grandy & Company, Elizabeth City, N. C., was an Office visitor on July 30. He is planning a trip through the corn belt, returning through the South and so obtaining information as to routes which would give him the fullest opportunity for seeing the corn belt agriculture.

John G. Reisner, who took his Master's degree in farm crops at Cornell University several years ago and submitted a thesis giving the origin, history, and characters of the wheat varieties of New York State, was an Office visitor on July 29. During the past 6 years he has been engaged with a missionary college at Nanking, China, and is now taking a year's leave of absence in America.

Miss Janet L. Wilson, who resigned from the western wheat project more than a year ago to enter the school for nurses at Johns Hopkins University, Baltimore, renewed old acquaintance in Cereal Investigations on July 27.

Dr. C. G. Woodbury, until June 30 Director of the Indiana Agricultural Experiment Station, now Director of Research for the National Canners' Association, with headquarters in Washington, D. C., visited the Office on July 26.

MANUSCRIPTS AND PUBLICATIONS

The galley proof of the paper entitled, "Fusarium Blight (Scab) of Wheat and Other Cereals", by Dimitr Atanasoff, was read on July 21, and the page proof on July 30. This paper is the result of cooperative investigation at the Wisconsin Experiment Station and is scheduled to appear in the Journal of Agricultural Research for October 1.

Page proof of Department Bulletin No. 883, entitled "Experiments with Flax on Breaking", by C. H. Clark, formerly in charge of flax investigations, but now with the Albert Dickinson Seed Company, Chicago, was read on July 29.

The page proof of Department Bulletin 869, entitled "The Inheritance of the Length of Internode in the Rachis of the Barley Spike", by Dr. H. K. Hayes and Dr. H. V. Harlan, was read on July 21.

The page proof of the paper by Dr. H. V. Harlan and Dr. H. K. Hayes, entitled, "Occurrence of the Fixed Intermediate, Hordeum Intermedium Haxtoni, in Crosses Between H. Vulgare Pallidum and H. Distichon Palmella", was read July 26. The paper is scheduled to appear in the Journal of Agricultural Research for September 1.

Fifteen thousand copies of Farmers' Bulletin No. 554, revised, entitled, "Popcorn for the Market", by C. P. Hartley and J. G. Willier, have been issued and are being distributed.

Manuscript for a revised edition of Farmers' Bulletin 415, entitled "Seed Corn," by C. P. Hartley, Agronomist in Charge of Corn Investigations, was submitted for publication on July 30.

Page proof of the paper entitled "Genetics of Rust Resistance in Crosses of Varieties of Triticum Vulgare With Varieties of T. Durum and T. Dicoccum", by H. K. Hayes, John H. Parker, and Carl Kurtzweil, was read on July 31. This paper, which embodies the results of cooperative research at the Minnesota Experiment Station, will appear in the Journal of Agricultural Research for September 1.

Page proof of Farmers' Bulletin No. 1137, entitled "Grain Sorghums: How To Grow Them", by Benton E. Rothgeb, formerly of this Office but now in the Bureau of Markets, was read on July 30.

OFFICE OF CEREAL AND FORAGE INSECT INVESTIGATIONS

The Office in the Bureau of Entomology which is of most interest to cereal investigations is the one named above. Through the courtesy of W. R. Walton, Entomologist in charge of that office, several of his field assistants have rendered very helpful service to our field men. Mr. Walton has been kind enough to express a desire for fuller cooperation with our men in future operations and to state his belief that his men would be benefitted

thereby. Without doubt our field men also would benefit by closer contact with the field representatives of Cereal Insect Investigations.

Field representatives of Cereal Investigations should feel free to call on the field representatives of Cereal and Forage Insect Investigations for cooperation where opportunity arises and should reciprocate byy furnishing information regarding crops, crop varieties, and cropping practices whenever requested. To this end, a list of field stations of the Office of Cereal and Forage Insect Investigations follows. Mr. Walton writes: "A Few of these stations are studying forage crop insects almost exclusively, but most of them are investigating at least some of the insects affecting cereal crops."

FIELD STATIONS.

Arlington, Mass. (D. J. Caffrey in charge). Investigations of the European corn borer.

Carlisle, Pa. (P. R. Myers in charge). Insects attacking cereal crops, especially Hessian fly, the European grain stem sawfly, and the wheat midge.

Charlottesville, Va. (W. J. Phillips in charge). Investigations of the jointworms affecting cereal crops, corn ear worm, wireworms, and miscellaneous insects affecting cereal and forage crops.

Columbia, S. C. (Philip Luginbill in charge). Corn ear worm and corn root worms.

Knoxville, Tenn. (G. G. Ainslie in charge). Investigations of the Hessian fly and sod webworms.

Lafayette, Ind. (W. H. Larrimer in charge). Investigations of cereal insects, principally, including Hessian fly, chinch bug, cutworms, grasshoppers, wheat midge, etc.

Webster Groves, Mo. (A. F. Satterthwait in charge). Investigations of the billbugs attacking cereal and forage crops. Also the Hessian fly, chinch bug, and other cereal insects.

Wichita, Kans. (J. R. Horton in charge). Major projects, Hessian fly and chinch bug investigations.

Sioux City, Ia. (C. N. Ainslie in charge). Miscellaneous insects attacking cereal and forage crops. Special investigations of the western cutworms.

San Antonio, Tex. (C. H. Gable in charge). Investigations of the sorghum midge and miscellaneous insects attacking cereal and forage crops.

Tempe, Arizona. (V. L. Wildermuth in charge). Investigations of miscellaneous insects affecting chiefly forage crops. The alfalfa seed chalcis, the

alfalfa caterpillar, and the many species of grasshoppers affecting alfalfa in the southwestern States.

Salt Lake City, Utah. (G. I. Reeves in charge). Major project, investigation of the alfalfa weevil.

Forest Grove, Ore., with a sub-station at Ritzville, Wash. (L. P. Rockwood in charge). Insects under investigation at Forest Grove are chiefly those affecting forage crops, such as clover flower midge, clover root borer, and grasshoppers; also investigations of the Hessian fly in the Pacific Northwest. Substation at Ritzville is at present in charge of Merton C. Lane, who has for his major project the investigation of the wireworms affecting wheat in eastern Washington and Oregon.

Sacramento, Cal. (C. M. Packard in charge). Investigations of the miscellaneous insects affecting cereal and forage crops, chiefly in the Sacramento and San Joaquin Valleys.

PROJECT REPORTS

218. CEREAL DISEASE INVESTIGATIONS.

(Dr. H. B. Humphrey, Pathologist in Charge.)

218-A. INVESTIGATIONS OF IMPERFECT AND SAC FUNGI.

(Dr. A. G. Johnson, Pathologist in Charge).

Investigation of Foot-Rot or Take-All. (H. H. McKinney, in charge

RESISTANCE IN WHEAT TO THE SO-CALLED TAKE-ALL DISEASE. [See correction p. 268, No. 19, this volume.]

The so-called take-all disease was first found in the United States in the spring of 1919, in Madison County, Illinois. Later in that season it was found in Mason and Sangamon Counties, Illinois, and in Porter and Laporte Counties, Indiana. The cause of the disease is not yet fully known.

As soon as this disease was discovered, cooperative field experiments were planned and carried on by the Office of Cereal Investigations, Bureau of Plant Industry, United States Department of Agriculture, and the Department of Agronomy, Illinois Agricultural Experiment Station. These field experiments were conducted on infested fields located near Granite City, Madison County, Illinois.

In 1920, take-all was very destructive on wheat in the experimental plats at Granite City. This was especially true in the case of certain varieties. The disease also was severe in a few commercial wheat fields near Granite City and also in Mason County, Illinois.

In Indiana the State Agricultural Experiment Station established a series of experimental plats on one of the infested fields near Wanatah, Indiana. The disease recurred in these plats in 1920.

While the disease was very severe where it occurred in 1920, it was very much less prevalent than in 1919. This undoubtedly is explained by the fact that the majority of farmers in the infested districts did not sow any varieties which gave evidence of being susceptible to take-all in 1919.

Susceptibility of Different Wheat Varieties.

Results from experiments thus far indicate that wheat is the only crop attacked. As to the relative susceptibility of different wheat varieties, very striking differences became evident this year in the series of plots at Granite City. Certain wheat varieties were found to be very susceptible to the disease while others showed striking indications of resistance. These differences became evident rather early in the spring and remained so throughout the season. This series of experiments in susceptibility will be briefly described and the results summarized, as follows:

Ten of the leading varieties of winter wheat adapted to Illinois conditions were used. These were sown in adjacent parallel strips a drill-width (54 inches) wide and 50 rods long, on a uniformly infested level field.

The results are briefly summarized in the following table. The varieties are listed in the same order in which they were sown in the plots.

Table showing the results of the experiments in 1920 with wheat and rye varieties, a barley and an oat.

Variety			Per cent take-all	Yield bushels per acre.	Weight per bushel
"Salzer's Prizetaker"	winter	wheat	90	8.87	54.75 (a)
Red Wave	"	"	0	28.33	56.75
Illini Chief	"	"	25-30	24.08	58.00
Harvest King	"	"	trace	28.83	56.50
May	"	"	0	25.61	58.50
Red Cross	"	"	78	13.51	53.00 (a)
Fultz	"	"	2	26.20	59.50
Winter Fife	"	"	trace (b)	32.87	58.50
Turkey Red	"	"	0	21.50	60.00
Fulcaster	"	"	2	25.80	60.75
Rosen	"	rye	0	17.44	56.00
Common	"	"	0	16.33	52.50
Durum	spring	wheat	(c)	(d)	(d)
Marquis	"	"	(c)	(d)	(d)
Red Fife	"	"	(c)	(d)	(d)
Illinois No. 1	"	"	(c)	(d)	(d)
Wisconsin Pedigreed	barley		0	33.83	41.50
Texas Red	oat		0	39.32	35.50

(See footnotes on next page.)

(a) The weight per bushel of "Salzer's Prizetaker" and Red Cross would have been much lower had it not been for other varieties mixed with th them.
(b) Only two plants in the entire plot.
(c) The spring wheat varieties developed symptoms somewhat similar to but not identical with the take-all symptoms of the winter varieties.
(d) Yields and weights not obtained.

It is evident from the table that the "Salzer's Prizetaker" and Red Cross varieties are very susceptible to this disease and that Red Wave, May, and Turkey Red apparently are immune. The immunity of these varieties offers a very promising means for controlling the disease. The all-important thing in the infested areas is to avoid the sowing of the very susceptible varieties, particularly "Salzer's Prizetaker" and Red Cross, and to grow the best adapted varieties known to be immune.

The variety grown in central Illinois under the name "Salzer's Prizetaker" has white chaff and red kernels and it is this variety which is susceptible and should not be sown. The original Salzer's Prizetaker was a variety with brown chaff and white kernels.

The susceptible Red Cross variety grown in central Illinois also has white chaff and red kernels. There is another variety grown to some extent in the eastern United States under the name of Red Cross which has brown chaff and red kernels. Both these varieties are beardless.

218-B. RUST INVESTIGATIONS.

(Dr. H. B. Humphrey, Pathologist in Charge.)

STEM RUST INVESTIGATIONS

(Dr. E. C. Stakman, Pathologist in Charge.)

Berberis (Mahonia) repens and the development of stem rust.

During the period June 19--30, 1920, the relation of Berberis repens to black stem rust was studied.

The places visited were Denver, Golden, Boulder and Walsenburg, Colorado; Laramie and Cheyenne, Wyoming; Bozeman, and neighboring points in Montana.

Prevalence of Mahonia, Colorado: At Denver no Mahonia was found except some unrusted plants which we planted in Cheyenne Park. In a canyon about two miles from Golden there was an enormous amount of Mahonia growing all over the hill sides. In some places there was practically a pure stand of the shrub. At Boulder, there was not quite as much, although it was very plentiful in Boulder, Canyon. At Walsenburg, none was found.

Wyoming: At Laramie there was a considerable amount of the shrub about five or six miles from town.

Montana: Many of the hills about Bozeman are almost covered with the plant.

Rust on Mahonia: Uropyxis sanguinea was found in abundance at all places visited where Mahonia was found. P. fendleri was rather uncommon. There was some at Golden and some at Boulder. At the other places it was impossible to find any.

Grasses near Mahonia: The following grasses were found in considerable abundance near the Mahonia: Stipa spartea, Stipa viridula, Hordeum pusillum and Hordeum jubatum, Agropyron smithii, Agropyron sp., Elymus condensatus (in some places), Koeleria cristata, Festuca sp., and Poa pratensis. It was remarkable that in many of the places where most of the aecia occurred on Mahonia there was practically no Koeleria. If the rust on Mahonia came mostly from Koeleria this would hardly be expected.

Rust on Grasses. There was practically no rust on any of the grasses. A little leaf rust was found on Agropyron but aside from that no rust had developed on the grasses.

Rust on Barberries. I made a trip with Mr. Fitzsimmons, the Assistant Barberry Leader of Colorado to points near Denver in order to make observations on barberries. Practically all of the barberries which were seen were very heavily rusted. The rust already had spread to Agropyron smithii, Hordeum jubatum, Hordeum pusillum, Bromus sp., and several other grasses. In some places the rust already was extremely heavy on the grasses. This was in very sharp contrast to the condition of grasses at some distance from the barberries. It also was in sharp contrast to the conditions found on Mahonia. As the barberries were so heavilyy rusted it would seem that, if Mahonia was at all susceptible in the field, at least a small amount of rust should have developed. This is also to be expected on account of the fact that the aecia of Puccinia fendleri were by no means uncommon, nor was the Uropyxis sanguinea uncommon. It would seem reasonable to suppose, therefore, that under the conditions observed Mahonia does not rust commonly with Puccinia graminis. However, greenhouse inoculation experiments have shown clearly that Mahonia can be infected and further careful research may be successful in discovering some of the rust. I examined the big hedge around the park at Cheyenne and found just a trace of barberry infection.

Rust on Grains. Many grain fields were examined carefully but no rust was found. The only places where rust had been found in Colorado were those where barberry had been heavilyy rusted. None was found in Montana.

Notes by C. R. B.

Professor C. V. Piper has just completed a manuscript discussing the identity and geographic distribution of the species of barberry occurring in the western States which have been referred by some authors to the genus Mahonia. His conclusions are as follows:

"In the light of the data presented above, the specific name aquifolium should be retained for the shiny-leafed, usually tall species of the northwest coast which extends into the interior of Washington as far as Spokane, while the name repens should remain associated with the smaller plant of Montana, which in various forms ranges over much of the area east of the Cascade Mountains from British Columbia and Montana to California and New Mexico. A very extensive bibliography of these Berberis species up to 1878 may be found in Watson's Bibliographical Index (pp. 34-35)."

Under date of July 30, Dr. Stakman writes as follows concerning the identity of the species on which he has conducted inoculations experiments under greenhouse conditions:

"The Mahonia which we succeeded in infecting was undoubtedly the tall form. It was labeled Mahonia aquifolium when it came from the nursery. Since the trailing form is scarcely ever cultivated and since the characteristics of the plant which we infected were those of the tall form it undoubtedly was not Mahonia repens."

"We have inoculated the small Mahonia (the one which you have been calling Mahonia repens) in the greenhouse, but so far have not obtained successful infections. I am still inclined to think, however, that under favorable conditions we will be able to infect the plants."

Barberry Eradication Campaign.

(Dr. F. E. Kempton, Pathologist in Charge.)

COLORADO. Agricultural College, Fort Collins (John R. Fitzsimmons). Barberry eradication in Colorado during July has been mainly the rural survey and rechecking of plantings for sprouts. The data gathered from the recheck for sprouts show that sprouts were found in nine out of ten counties rechecked. Since June first, 1071 properties, or 14.5 per cent have been rechecked and bushes on 155 of these were found sprouting. Of the 16,101 bushes rechecked, 1776, or 11 per cent were found sprouting. The percentage of bushes sprouting ranged from one to sixty per cent in different counties.

In Fremont County an interesting problem developed. De Weese Lake, a natural body of water, had been transformed some years ago into a reservoir for a supply of irrigation water. Mr. De Weese, the owner of a large share

of the land adjoining the lake, had planted a large hedge of Berberis vulgaris when he first located there some twenty years ago. These bushes grew and fruited. The birds scattered the seeds along the edge of the lake among the willows, and in orchards and along the fence rows and many seedlings developed. When these bushes were found and the area surveyed, it was found also that seed had been carried by the irrigation water to many farms in the vicinity. Many farmers, admiring the plants also had dug a few bushes from the lake shore and given them a home in the front yard.

The help of some farmers and the irrigation company employees was enlisted and twelve hundred and seventy-six bushes were dug from an area of about four square miles. The name and address of each farmer receiving his irrigation water from this source was taken from the books of the company. At an early date each of these persons will be sent a bulletin, an illustrated life cycle card with barberry specimens mounted, and a letter enlisting his services in locating bushes that may have been missed in the survey.

ILLINOIS: State Entomology Building, Urbana (L. R. Tehon). I have just recently returned from Stephenson County where our men are doing field workin in barberry eradication. While in an open country rural scouting can be carried on very rapidly, covering from sixty to seventy-five miles a day, In a wooded country this is not possible. We have found it absolutely necessary in certain regions of that county to stop and carefully go over every bit of wooded area we found and it appears advisable to do this with every woodland in the county. On Friday last, in the morning, I ran upon a typical example of this kind. We drove out from Freeport northwest on the State road towards Lena and, following what has proved to be the best custom, turned north a mile out of the city and again went at the next section corner. About one-half mile along this road we came to a creek, two branches of which united near the road after flowing from opposite directions through the sections north and south of the road.

I suppose it was not more than a quarter after eight in the morning when we reached this point. We stopped the automobile and got out, filling our pockets with barberry tags. Brewbaker and I followed the south branch first and found it running through a rather narrow rocky gorge with steep sides on which were growing an abundance of gooseberry and juniper. We followed the creek along its winding course, perhaps traveling on foot through the timber land a good two miles and a half and came at length to a place where the land had been somewhat cleared. Up to that point, which was not in sight of any of the four roads surrounding the section, we had found no indication of barberries. We were about to give up the search and turn back to the road when we saw a single large bush standing upon the hillside. This encouraged us to go south, the few hundred yards necessary to complete the woods, and before we had finished this we had found twenty-six bushes.

Returning to the road, we thought it absolutely necessary to scout the woods along the creek branch from the north. This connection rebranched several times in the section and in following it up to its various sources and in thoroughly scouting the wooded area along its branches I am certain we must have traveled upwards of eight miles. During that entire trip we found only one barberry bush. This bush, however, was a big one, sixteen or seventeen feet tall, and well worth finding.

It was already approaching noon and so after completing the survey of those creeks we planned to finish the remaining part of that side and the west side of the section around which we were traveling. On the west side we found a small creek running west into the section west of the road, and on following the creek we came upon a small group of barberries, only about six, in a small patch of woodland. Following the creek further we scouted a larger woodland in which there must have been a thousand bushes if one were to count all of the seedlings around the bottoms of the larger bushes. The owner of this piece of ground had been expecting us to come and find the barberryeand promised us very readily that he would see that they were grubbed out. The bushes in this patch and in some of the others were so exceedingly large that we have very freely advised the use of dynamite in removing the bushes.

During that morning you will see that we were able only to cover a distance of at the most, eight miles. While this probably is not typical it indicates what is to be encountered in some instances.

INDIANA: Purdue University Agricultural Experiment Station, La Fayette (R. J. Hosmer). No report.

IOWA: Iowa State College, Ames (J. M. Raeder). June. All work on reports in the office of the State leader. Field work, continued eradication of wild areas already started in May. This work was near Mason City in Cerro Gordo County and near Clermont, in Fayette County.

July: The three counties, Lyon, Osceola, and Dickinson in which rural work was begun July 1, have been completed. The survey of the rural properties in three counties adjoining on the south, namely Sioux, O Brien, and Clay, has been started.

MICHIGAN: Agricultural College, East Lansing (W. F. Reddy). No report.

MINNESOTA: College of Agriculture, University Farm, St. Paul (Leonard W. Melander). The work during July progressed quite smoothly in spite of the fact that the excessive rains made the roads almost impassable the first half of the month. A total of 27 new plantings were reported, 25 of which were destroyed. Of the original plantings plus those previously reported, 1724 bushes were destroyed in Minnesota in July.

On July 1 three teams and three cars were all ready to start for their respective fields of work and by July 7 all were in the field. Three counties in S. W. Minnesota (Nobles, Jackson and Pipestone) have been completely surveyed. Every section in every township was checked.

These three counties represent a moderately old section of the State, consequently the abundance of barberry bushes was also moderate. The following is a summary of these counties after a complete survey:

County	Plantings Found	Plantings Destroyed	Bushes Found	Bushes Destroyed
Jackson	4	4	63	63
Nobles	10	10	140	140
Pipestone	19	16	273	146

The greater proportion of these bushes were heavily infected with rust. The country in this section is very flat and one bush might infect a grain field many miles away. All through that part of the state stem rust was heavy, especially on wheat. Fields varied. Very little wheat is grown in that section on account of rust. Rust on barley varied from a light to a medium infection. The epidemic was noticeably spotted. The oats were heavily infected with crown rust but the stem rust varied from none to a medium infection. Spottedness was also prevalent int the oat fields.

At Montgomery and Worthington, the scouts were able to trace immediate infection from barberries to grains and grasses. The latter was most thoroughly checked. A planting of 50 bushes had recently been removed from a grove near a farm house. The rusted grasses found in the grove were Agropyron repens, Elymus robustus, and Hordeum jubatum. Just on the other side of the fence adjacent to a field of oats, Agrostis alba and Hordeum jubatum was abundant. Hordeum jubatum indicated early infection as it was the only grass on which the rust was in the black stage. The oat field had a light infection. Along the edge toward the barberry planting, there were a few clumps quite heavily infected but farther out in the field, postules were scattered sparingly through the field. Beyond a half mile from these no Agrostis alba was found infected, although this grass itself was abundant everywhere.

We are doing everything we can in publicity. Outside of the counties in which the survey has been done, articles appeared in the Red Wing Daily Republican, The Organized Farmer (Non-partisan, Goodhue County) and the Weekly News Letter, (University Farm, St. Paul, Minn.).

Preparation of demonstration for the Minnesota State Fair, which it to be held from September 4 to 11, inclusive, will be a large portion of our program during the month of August in this office. It is our plan to have a booth. With the aid of Mr. George, et al, we are going to arrange a demonstration so that it can be transported to county fairs and be easily put on exhibition.

MONTANA: State College of Agriculture and Mechanic Arts, Bozeman. Mr. R. B. Streets, former leader, resigned July 24. H. E. Morris has been appointed leader in his place.

All barberries known to exist in Montana have been eradicated. The sites of all plantings found in the eastern two-thirds of the State have been reinspected and the sprouts found have been eradicated. Mr. Morris will reinspect the western portion of the State during September.

NEBRASKA: College of Agriculture of the University of Nebraska, Lincoln (James A. Faris). Good roads throughout most of the month enabled us to complete the survey of rural districts in four counties, Adams, Burt, Butler and Washington. A total of 227 unreported bushes were found and 2,221 bushes were removed. The latter includes bushes previously located but not reported as removed. The rust on the barberry has dried up and in many cases the dead patches have broken out of the leaf entirely.

The stem rust was pretty generally distributed over the state by the 20th of June and the fact that our entire winter wheat crop was very nearly one week later than it usually is made the loss heavier this year than we have had previous years. While it was possible to trace the spread of the rust early in the season from the infected barberry bushes, we could not do so after the 5th of July. By that time the rust had developed in such quantities that it seemed as prevalent several miles from barberry as it was within 500 or 600 feet from the bushes.

A new leaflet advising barberry eradication and giving information concerning other means of fighting the stem rust is being prepared by the Extension Department for general distribution. Other publicity, including fair demonstrations, movies and lantern slide exhibits, is being conducted.

NORTH DAKOTA: Agricultural College, Agricultural College (George C. Mayoue). No report.

OHIO: College of Agriculture of Ohio State University, Columbus (John W. Baringer). June and July reports.

June: One county in Ohio has been thoroughly covered in a farm-to-farm barberry survey. Every farm-stead was inspected. Numerous farmers were engaged in conversation regarding the relation between common barberries and black stem rust. An abundance of barberry literature was distributed among interested parties. Colored barberry eradication posters were tacked up in approximately two hundred conspicuous places, along the roads, in various sections of the County. A total of 427 common barberry bushes were found in ten separate locations. Eighty-five per cent of these barberries were removed previous to July 1.

The Agricultural Agent of the county referred to above has been very enthusiastic about our project. He had taken note of local stem rust epidemics during the past few years and was able to furnish valuable information in this regard. The responsible barberries have been found in every neighborhood in his county where, according to his knowledge, stem rust epidemics have been serious.

Two field assistants were employed during the latter half of June. They began a survey of Columbus and covered about two-thirds of the city previous to July 1.

July: In the early part of July the barberry survey of Columbus was completed. The survey of Chillicothe was also finished. 4,276 barberry bushes were found in 341 locations within the Columbus city limits. With the exception of Cincinnati, every town in Ohio having a population of more than three hundred has been covered by the original Barberry survey.

The farm-to-farm survey, completed in one county previous to July 1, is in progress in three counties at present. Counties adjacent to the Indiana-Ohio-Michigan line will be worked, with one or two exceptions.

A very large planting of escaped barberries has just been discovered near Lewisburg, Ohio, in Preble County. It is one of the largest plantings which has been brought to our attention so far. A majority of the large patches of escaped barberry in this State have been located along stony river beds.

SOUTH DAKOTA: College of Agriculture, Brookings (H. C. Gilbert). On July 1, the field men arrived at Sisseton to start a farm survey of Roberts County for barberries.

On July 3, a considerable number of reports had been received that a wheat field northeast of Sisseton had been severely rusted every year for over 15 years. The place was visited and a large hedge of big barberry bushes was found in a grove near this field. All of the barberries were rusted. Examination of the grain in the edge of the field near the barberries showed that the rust had already spread to the grain and was abundant. Upon further examination of this field at a distance of one-fourth and one-half mile, the rust infection was found to be much lighter at the greater distance. This indicated clearly that the rust was starting early and abundantly from the barberry bushes.

This case against the barberries was the more striking because six men who were working west of Sisseton and between Sisseton and Browns Valley, all day July 3, found no barberries on any of the fifty farms visited. Neither did they find a trace of black stem rust on any of the grain fields on these farms.

Mr. Stavig, who owns the grove in which the barberries were planted, did not know that they were there. He says that they will be destroyed immediately. Certainly the evidence against the barberry in this case is plain and convincing. Eradication of all the barberries in the State will stop black stem rust epidemics. In the past few years the annual loss from black stem rust in Roberts County has been about $50,000.00.

WISCONSIN: College of Agriculture of the University of Wisconsin, Madison (Noel F. Thompson). The work in Wisconsin has been progressing steadily during July. In previous years practically all the barberries have been removed from the cities and towns of the States. This season we are working chiefly in the country and we plan to finish one county before going to the next.

Over 75 new plantings of barberries have been found on farms this month. In the southeastern county of the state, we estimate that no field was further than one mile from a barberry, and as practically every barberry was heavily infected, it is not surprising that stem rust on the grain is universal there.

In most cases the farmers did not know they had barberries on their farms but in at least two instances where there were extensive plantings the farmers not only knew they had barberries, but were so convinced of their

harmfulness that they had taken the trouble to spray the bushes. They were rather disappointed when told that the plants must come out anyway.

WYOMING: College of Agriculture, University of Wyoming, Laramie. Mr. Ralph U. Cotter was appointed leader of the barberry eradication in Wyoming, effective July 21. He is now spending a few days in Nebraska aiding in the work there and becoming familiar with the management of the campaign.

Stem Rust Observations in Illinois, Iowa, Minnesota, and Wisconsin.

By E. C. Stakman, July 15-29, 1920.

Places visited: Madison, Wisconsin; Chicago, Peoria and Galesburg, Illinois; Burlington, Albia and Ames; intermediate points between Ames and Eagle Grove and intermediate points between Eagle Grove and Sheldon, Iowa; Nobles, Blue Earth, Hennepin, Anoka, Sherburne and Wright Counties, Minnesota.

General Rust conditions. Rust is practically universally present. However, it is quite clear that there is not a uniform epidemic, although it must be admitted that rust is epidemic. The lack of uniformity of the rust development can be observed from the following comments on conditions at several selected places.

Madison, Wisconsin: On one field of winter wheat in which Dr. Dixon and Dr. Johnson think overwintering of urediniospores occurred there was a heavy infection, probably at least 50 to 60 per cent on the regular rust scale. The rust apparently started in a low place in the plot at the base of a single plant. It then apparently spread gradually over the entire plot.

On the Hill Farm, approximately two or three miles distant, the rust infection was much less severe. On the winter wheat plots there was only a moderate amount of rust, not more than 15 per cent to 20 per cent. In fact, there was not as much rust on the winter wheat at Madison as there had been on the spring wheat in Minnesota on July 3. The observations at Madison were made July 15. The rust on spring wheat at Madison was rather light. It would not be marked higher than 15 per cent. Very clearly, the rust could not have started at Madison before it did within a radius of fifty miles of St. Paul, Minnesota, because in many fields it already was much more widespread and had developed to a greater extent in Minnesota the first week in July than it had in Madison by July 15.

Near Chicago, Illinois, there was some infection on Hordeum jubatum but the rust was not at all heavy.

Peoria, Illinois: A thorough search was made for rust on wheat and grasses. Hordeum jubatum was rusted only to a very slight extent. Occasionally plants were moderately infected. Much of the wheat had been cut a few

days before July 17. Stem rust evidently had not reduced the yield appreciably. There was less than 20 per cent in all the fields examined. The only really heavy rust attack had occurred on some late plants which were still standing along the edges of ditches. One some of these plants the percentage of infection was between 50 and 60. Several fields of wheat which were ripe, but not yet cut, were almost free from rust. There was not more than 5 per cent of infection in these fields.

Galesburg, Illinois: Rust was almost universally present on wheat and Hordeum jubatum. The wheat was almost ready to harvest, although some of it might have been left another week before cutting. The rust was very much heavier than at Peoria, but here again it was no heavier than it had been in Minnesota during the first week in July. There was from 25 to 30 per cent of rust in most fields, but apparently not much damage had been done and the wheat was already past danger.

Albia, Iowa: Some fields of wheat had been cut, and some were still standing. There was an average of less than 5 per cent of rust on the cut wheat. Some fairly heavily rusted plants were still standing on the edges of the fields. On the standing wheat there was from 5 to 10 per cent infection. The rust had done no damage whatever. There was only a trace on Hordeum jubatum. In general the infection on wheat and grasses near Albia was very light.

Knoxville is only forty or fifty miles north of Albia, and here the rust was very heavy, according to Mr. Crawford, of Ames.

Ames, Iowa: At Ames apparently all of the wheat and barley was heavily infected. The infection was as high as 75 per cent. Hordeum jubatum was universally and very heavily rusted. Unquestionably the yield of wheat was being materially reduced.

Ames to Eagle Grove and Sheldon, Iowa: In company with Dr. Melhus and Mr. Crawford, I went by automobile from Ames to Eagle Grove. Ten miles from Ames Hordeum jubatum was rather lightly rusted. Near Webster City it again was heavily rusted. Only one wheat field was seen. Practically nothing but corn, oats and timothy was being grown. The one field of spring wheat which we saw was about five miles from Eagle Grove. This was already heavily rusted, and was not ready for harvesting for a week. The percentage of infection averaged about 70 and, without question, the yield must have been considerably reduced.

Traces of infection on Hordeum jubatum were found at all stations between Eagle Grove and Sheldon. I traveled by local train and got out at practically every station at which the train stopped, and succeeded in picking up rusted Hordeum jubatum at every place.

Worthington, Minnesota: The farmers in Nobles County have practically discontinued growing wheat. The rust and scab have caused such serious reduction in the yield during the past few years that the farmers are growing almost nothing but corn, oats and timothy. The only wheat fields which were found were heavily rusted, and undoubtedly considerable damage was being done. Hordeum jubatum was almost universally and quite heavily rusted, although

there was considerable variation in the amount of infection. At one farmstead which was visited, about fifty heavily infected barberry bushes had been dug up recently. Hordeum jubatum, Agrostis alba and oats near these bushes were all rusted. Some of the plants were heavily rusted, but the rust had not spread far in the fields.

Mankato, Minnesota: At Mankato several fields of Marquis wheat were examined, and while the rust was fairly heavy along the edges of the fields and in low places, it had done practically no damage. The wheat was nearly ripe and the prospects were for an excellent yield. The contrast with the conditions at Ames and Eagle Grove was very remarkable.

Other general observations: Stem rust on wheat had already developed as far north as Winnipeg by July 1. Shortly after it was found in southeastern Saskatchewan. At present it is heavy throughout the spring wheat region, although there is considerable variation in the degree of infection. Most fields within a radius of 75 miles of St. Paul, Minnesota are very heavily infected. Others are infected but little. Some wheat as far north as the Canadian line is heavily infected, and undoubtedly will be injured seriously. However, the weather conditions have been unfavorable for rust development during the past three weeks, and it is quite likely that many fields will escape serious damage unless unfavorable weather conditions again occur.

General summary of prospects: In Iowa, Nebraska and southern Minnesota, much rust damage has been done. Rust also is heavy in South Dakota, although there is still a chance that some wheat may escape damage.

Source of initial infection: The rust came so quickly, and developed so uniformly over a wide area that it has been almost impossible to determine the source of infection. Stem rust did not overwinter in the uredinial stage on winter wheat at St. Paul, Minnesota. There is some evidence that it may have overwintered on a plot of winter wheat at Madison. The presumptive evidence is strong that rust may have developed from barberry in eastern Nebraska, Iowa, southern Minnesota and eastern South Dakota. On the other hand, it is quite possible that it may have spread gradually northward from farther south. One of the striking facts is the lack of uniformity of infection. Regardless of the source of initial infection, this might be explained by the local variations in weather conditions. If overwintering of urediniospores occurred commonly north of Missouri, it would seem that timothy would be more heavily infected. It is known that the urediniospores of timothy rust live over winter. However, the infection on wheat is much heavier than that on timothy. It would also seem that if urediniospores overwintered commonly that Agrostis alba would be more heavily infected than wheat, both on account of the nature of the plant and because it so often grows in low places. However, the only rust which has been found on Agrostis alba so far has been traced to rusted barberry. Barberries began to rust early in May, and rust began to develop in wheat fields about June 20. So far, the circumstantial evidence is strong that much rust undoubtedly came from barberry. On the other hand, there also is evidence that some infection may have come from overwintered urediniospores and there is also some slight evidence that a certain amount of it may have spread from the south to the north.

A detailed map showing the development of barberries and stem rust is being prepared, and a copy will be sent to the Office as soon as the map is completed.

218-D. SMUT INVESTIGATIONS.

(Dr. George M. Reed, Pathologist in Charge.)

Leaf (Flag) Smut of Wheat.

Leaf smut or flag smut of wheat was reported in the United States for the first time in 1919. During that year it was found in wheat fields in the vicinity of Granite City, Madison County, Illinois. An extensive survey was conducted in that year and leaf smut was found to be present in 33 fields, comprising about 825 acres. Commonly only a trace of leaf smut was present but occasionally as much as 1 to 2 per cent was found, at least in certain parts of a field.

Leaf smut of wheat has long been known in Australia, Japan, and India. Records of its occurrence in southern Europe also have been found. In Australia, it is recognized as one of the most serious diseases of the wheat crop. On that continent it usually is spoken of as flag smut. The term leaf smut, however, is much more descriptive of the pathological effects of the disease on the wheat plant. Not only is the flag leaf infected, but most of the other leaves on the shoot.

During the present season, leaf smut has appeared in the same district as last year. A new survey has been made and the disease has been found in 111 fields, comprising about 2,500 acres. These fields are confined to an area of about 47 square miles. So far, leaf smut has not been found outside of the area around Granite City, Illinois, which was quarantined last year on account of the presence of this disease and the so-called take-all.

In most fields only a trace of leaf smut was present. In a few cases, however, as much as 20 to 25 per cent of the stalks were found infected. In such cases the disease was unevenly distributed throughout the field. Some parts of a field could be found where there was either no leaf smut or only a trace, and in other parts a high percentage of infection was observed.

Several hundred stalks of infected plants were collected. Very few of these showed any evidence of heading. Considerably less than 1 per cent of infected stalks ever produced heads. Further, the stalks that did produce heads generally showed infection on the stem just below the head and, as a result, produced little if any seed.

There is considerable evidence that soil infestation occurs. In the experiments, clean wheat seed was sown in soil that produced a smutted crop last year. A small percentage of infected plants appeared. It remains to be determined how important a factor soil infestation may be in the persistence of this disease. It is well known that the disease is seed-borne like the other cereal smuts.

As leaf smut appears to be confined to a limited area, efforts are being made by the United States Department of Agriculture, the Illinois State Department of Agriculture, and the Illinois Agricultural Experiment Station to prevent its spread beyond the present recognized limits, as well as to

eradicate it. Last Year the area was quarantined and this quarantine is being maintained this year.

The plans agreed upon to accomplish these two purposes (control and eradication) are: (1) Thoroughly treat all grain with formaldehyde as it comes from the separator, using 1 pound of formaldehyde to 25 bushels of grain. This treatment results in making the grain worthless for seeding purposes, but does not materially effect its milling qualities. (2) Burn all straw in the quarantined area as soon as possible after thrashing. (3) Sow no wheat on infested fields and so far as possible sow no wheat on land which grew wheat this year. The infected stalks wither before the wheat ripens. As a result, large numbers of them remain in the stubble or fall out of the sheaves in harvesting and hauling so that a considerable amount of infested material is left on the land. (4) Obtain seed wheat from localities known to be free from leaf smut. (5) Treat all seed sown this fall by the copper sulphate or bluestone method. This consists in dipping the grain for ten minutes in a bluestone solution of 1 pound to 5 gallons of water and then dipping in a lime solution of 1 pound to 10 gallons. The great advantage of this treatment is that the seed remains coated with the bluestone and lime, and this coating protects it to a large extent from infection by spores possibly present in the soil. (6) Grow varieties that so far as known are highly resistant to leaf smut. The United States Department of Agriculture and the University of Illinois have carried on some experiments during the past year, with promising results. A field was obtained for experimental purposes, near Granite City, Illinois. 86 different varieties and strains of wheat were sown on three different dates, October 7 and 8, October 17 and 18, and November 17 and 18. Several of these varieties winterkilled, but in June, 1920, records were obtained on 71 varieties or strains.

The worst infection was found in the earliest sowings. Only slight infection was found in those sown on the second date and none whatever in those of the third. However, none of the seed sown on November 17 and 18 came up until the following spring. Practically all of the varieties, however, germinated in the spring and developed in good shape, without showing any trace of smut.

The most susceptible varieties proved to be Dawson, Dawson Golden Chaff, Fultz, Jones Winter Fife, K. B. No. 2, Leap, Mealy, Purple Straw, Red Cross, and Rocky Mountain. The highest percentage of infection, about 20 per cent, was obtained with the Red Cross variety. This is very similar to, if not identical with, the so-called Salzer's Prizetaker, the variety so commonly infected in the leaf-smut area. Most of the other varieties showed a very slight infection, including Acme, Bearded Purplestraw, China, Currell Prolific, Dietz, Gypsy, Illini Chief, Kanred, Lancaster, Missing Link, Nebraska Hybrid No. 28, Poole, Red Rock, Red Wave, and Treadwell. A few varieties proved to be free from leaf smut - American Bronze, Fulcaster, Imperial Amber, Indiana Swamp, Mammoth Amber, Martin Amber, Red May, and Theiss.

The results given above are based on only one year's results and can not be accepted as at all conclusive.

Experiments were conducted with 30 different varieties in the greenhouse. Here the conditions were particularly favorable for infection, and fairly conclusive results regarding the behavior of the different varieties were obtained. Several Australian varieties of wheat were included as well as some common winter and spring varieties of the United States. The following varieties gave the percentage indicated of plants infected: 1 highly susceptible: Bobs, 95.3; Cowra, 92.6; Defiance, 88.3; Early Baart, 35.5; Fultz, 47.5; Hard Federation, 72.5; White Federation, 90.9; Red Cross, 85.4; and Salzer's Prizetaker, 75.7 per cent. 2, slightly susceptible: Bunyip, 2; Little Club, 2; Marquis, 7.8; Sonora, 1.9; White Australian, 4.1; Kanred, 5.4; and Mealy, 2.2 per cent. 3, free from infection: Cedar, Comeback, Early Defiance, Florence, Fulcaster, Galgalos, Poole, Red Rock, and Red May.

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PLANT INDUSTRY

C E R E A L C O U R I E R

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Personnel (Aug. 1-10) and Field Station (July 15-31) Issue.

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PERSONNEL ITEMS

F. F. Blaine, formerly of this Office, has been heard from at Meuse, France. Mr. Blaine is a member of a Harvard University unit doing reconstruction work in France.

J. C. Brinsmade, Jr., in charge of flax experiments on the field station at Mandan, N. Dak., made a flying trip to Dickinson, N. Dak., and Moccasin, Mont., during the week ending August 7, in company with W. E. Brentzel, in charge of flax disease investigations, at Agricultural College, N. Dak.

Dr. Edward C. Clayton, a graduate of Ohio State University in 1916, who received his M. S. degree from the University of Chicago in 1918, and the degree of Ph.D. from the University of Wisconsin in 1920, is now extension pathologist in Ohio, where he has been appointed a collaborator in the barberry eradication campaign, effective August 16.

S. M. Dietz, Assistant Pathologist in Crown Rust Investigations at the Iowa Experiment Station, spent the period July 16 to 19, inclusive, in an investigation of crown rust and its relation to species of buckthorn in Northern Iowa.

Harry A. Hass, a student in the College of Agriculture, University of Michigan, has been appointed for barberry eradication in that State, effective August 5.

James R. Holbert, in charge of corn rot investigations at Bloomington, Ill., in cooperation with Funk Bros. Seed Co., arrived in Washington August 7 for a conference on the Farmers' Bulletin being written by Dr. Hoffer and him.

Dr. A. G. Johnson arrived in Washington August 6 and will take charge of Cereal Disease Investigations until Dr. Humphrey's return.

Dr. C. E. Leighty returned on August 5 from his trip to the Cornell Experiment Station and other points in New York to study cooperative wheat and rye experiments. He expects to return to Ithaca on August 10 to continue this investigation.

Hazen H. Petrie, who has been a student at the University of Wisconsin during the past four years and has nearly completed his work for a doctorate degree, has been appointed as assistant in barberry eradication in Wisconsin, effective August 9.

Dr. E. C. Stakman, Pathologist in charge of stem rust investigations, left his headquarters at St. Paul, Minn., on August 7, for a long survey of rust conditions in the western provinces of Canada and in Alaska.

William E. Steil, instructor in botany at the University of Nebraska, has been appointed for barberry eradication in Wisconsin, effective August 9. He has had previous experience in the eradication campaign.

A. F. Swanson, in charge of cooperative cereal experiments at the Hays Branch Station, Hays, Kansas, started on August 9, for a 10 days trip to other stations in the southwest.

Dr. William H. Weston, Jr., is spending his annual leave (August 5-September 7, inclusive) at Great Barrington, Mass.

J. T. Wilcox, recently appointed for barberry eradication in Ohio, has declined his appointment and his appointment has been revoked.

Miss Florence S. Willey, Assistant Pathologist in Crown Rust Investigations at the Iowa Experiment Station, studied the epidemiology of crown rust and collected species of the buckthorn Rhamnus alnifolia, at various points in Minnesota and Wisconsin, from July 15 to 26, inclusive.

H. M. Woolman, in charge of smut investigations in Oregon, spent the period from July 8 to 26, inclusive, at Moro obtaining data on the extensive smut nursery. He also visited Hermiston before returning to Corvallis.

VISITORS.

Dr. William Broadhurst Brierley, Mycologist of the Rothamsted Experiment Station, Harpenden, England, has been a Washington visitor during the past week. He is making a tour of the United States for the purpose of becoming familiar with research in plant pathology.

Prof. A. T. Erwin, chief in truck crops at the Iowa Experiment Station, and Mr. Green, a grower and canner of sweetcorn at Marshalltown, Iowa, were Office visitors on August 9, for a conference concerning corn rot investigations.

Dr. Etienne Edmond Foëx, Director of the Station de Pathologie Végétale, Paris, France, was an Office visitor on August 9 and 10. Dr. Foex attended the Field Conference on Fruit Diseases in the Shenandoah Valley during August 3-6. He is planning to spend about a month in this country visiting agricultural institutions.

Dr. L. R. Jones, head of the Department of Plant Pathology, Wisconsin Agricultural Experiment Station, visited the Office on August 9, enroute to Wood's Hole, Mass., where he will attend the meetings of the National Research Council.

MANUSCRIPTS AND PUBLICATIONS

The edition of 30,000 copies of Farmers' Bulletin 1103, entitled "Growing Irrigated Grain in Southern Idaho," by L. C. Aicher, was received on August 6, and is ready for distribution.

Page proof of Farmers' Bulletin No. 1149, entitled "Growing Corn in the Southeastern States", by Curtis H. Kyle, was read on August 6.

Page proof of Farmers' Bulletin No. 1162, entitled "Proso or Hog Millet", by John H. Martin, was read on August 6.

Department Bulletin No. 823, entitled "Experiments with Kherson and Sixty-Day Oats," by C. W. Warburton and T. R. Stanton, of which page proof was read on February 13, has been delayed by the shortage of print paper. Early delivery of this bulletin now is promised.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). Outside work is practically over and I am working up results of the past season's work.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). The thrashing of all cereals grown in plats has been completed. Owing to mechanical trouble with the rod-row thrasher and to courtesy in loaning the machine to others, there still remain some wheat rod rows to be thrashed. At present fanning of the grain, some of which is badly mixed with weeds, is in full operation.

Various varieties and importations of buckwheat were sown July 16 in the detention nursery. The wheat, barley and oats which were sown in the same nursery about the middle of April have been harvested. The oat varieties did exceptionally well.

Mr. Leukel has finished harvesting and thrashing the cereals from the nematode plot and is now busy compiling the data regarding varietal susceptibility, distances which the nametodes can travel in the soil, longevity, and other phases of the problem.

During the latter half of July a precipitation of 2.08 inches was recorded at Arlington Farm, making a total of 4.97 inches for the month. The maximum temperature reached during the past two weeks was 95° and the minimum, 53°.

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love). During the latter half of July the wheat harvest was completed and the early barley and oats have been harvested from the nursery. The oat and barley plats, together with our increase plats, remain yet to be harvested. The wheat plats have been thrashed but yields have not been determined. The yield of wheat both on the plats and in the nursery has been very good. The oat crop on the station farm is very light. However, in certain sections of the State oats are looking very well. An inspection trip through the wheat section was made the last week in July. We were accompanied by Dr. C. E. Leighty. Wheat was unusually good. A number of fields were inspected as to their purity and freedom from mixtures.

The hybrid nursery of wheat has been harvested and the oats are practically completed, while a portion of barley remains to be done. Present indications, so far as yields are concerned, are that some of our new strains and hybrids of wheat and oats are superior to any other sorts. One of the barley hybrids received from Dr. Harlan a few years ago is showing up exceptionally well in plats, and on the fields and plans are under way now for the rapid distribution of this sort. This is a two-row selection of Manchuria X Champion of Vermont.

The material which was harvested at Chico has been received and will be prepared for fall seeding.

The following visitors inspected the cereal experiments and other work of the department during the last few weeks: Dr. C. E. Leighty of the Office of Cereal Investigations; Professor R. Summerby of Macdonald College, Quebec, Canada; Messrs. M. C. Rumsey, L. A. Toan and F. R. Perry of the Hickox-Rumsey Seed Co.; and Professor F. D. Gardner of the Pennsylvania State College.

(C. E. Leighty).--

CEREAL INVESTIGATIONS IN NEW YORK.

Report of trip made by C. E. Leighty in New York State July 15 to August 5, 1920, in connection with the cereal investigations being conducted in cooperation with the Plant Breeding Department of the New York State College of Agriculture at Cornell University, Ithaca, N. Y.

On this trip I inspected the rye, wheat, oat and barley experiments and assisted in harvesting some of the nurseries. Some notes on the work being done are given below.

Rye Breeding.

The rye breeding of the Plant Breeding Department at Cornell University in New York State is conducted principally in Columbia and Albany Counties. These counties are in the principal rye-producing section of the State. Very much more rye than wheat is grown in this section. The straw as well as the grain is sold by rye growers, special care being taken with the straw in thrashing and baling in order to keep it straight. Good prices usually are received for it.

Two rye nurseries were grown this year, one in each county. The several hundred rye selections and varieties in these were harvested July 19 to 21, ten days later than the harvest of last year. Some marked differences between the different strains and varieties were observed. The harvested nursery rows are taken to Ithaca where they are thrashed and yields determined.

Wheat Breeding.

The wheat breeding is conducted principally on the Station farm at Ithaca. The numerous strains and varieties are compared in several thousand rod-rows and a number of plats.

A beardless, red-kerneled selection with glabrous, white chaff appeared to be much the best of the varieties and selections grown in plats, confirming results of previous years. This strain will probably be increased and distributed to farmers.

Nearly all of the wheat grown in New York at present is of the soft white winter class. The principal varieties are Dawson Golden Chaff and Gold Coin. The Gold Coin type is grown under several names, such as No. 6 and Junior No. 6, the Junior No. 6 being a nearly pure form of the No. 6 derived by mass selection from that variety. There is good local demand for the soft white wheat for whole-wheat products and pastry flour. Red-kerneldd wheat therefore must be introduced advisedly and with caution.

In addition to the work of practical nature, intensive studies of the genetics of wheat also are being conducted.

Oat Breeding.

The oat breeding is being done at Ithaca and also at several outside points. Several strains already have been introduced and very satisfactory results are being obtained by growers. One grower who sold several hundred bushels for seed last year wrote that he could have sold 30,000 bushels for seed if he had had them. Another grower of one of these selected strains stated to me that thrashing machine operators said that last year the farmers who had oats grown from seed secured from him had good yields, while those growing ordinary oats had poor yields.

The introduction of oat varieties in New York is attended with some difficulties not met with in some other sections of the country. Most farmers grow only small acreages and use for feed nearly all that they produce. They desire good seed for their own use but are not in position to supply any large quantity for seed purposes.

One very high-yielding oat selection (No. 110-36) has been introduced in a small way and is being increased for further distribution. Although very desirable as a feed oat, this strain is light gray in color and might be discriminated against on the market. It has been crossed with other types in an effort to combine its high-yielding quality with a better color from a commercial standpoint.

Extensive studies on the genetics of oats also are being made.

Barley Breeding.

Numerous selections of barley are being tested at Ithaca and at other points. An extensive nursery near Aurora was harvested on August 4. One of Dr. Harlan's selections from a cross of Manchuria and Champion of Vermont appears very promising. It is 2-rowed with large kernel. A hundred bushels or more of this strain will be available for seed purposes this year.

Extensive studies on the genetics of barley also are being made.

INDIANA

Indiana Agricultural Experiment Station, La Fayette (H. S. Jackson and E. B. Mains). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). We are now completing our threshing of oats from rod-rows varietal experiments. No results have been determined as yet.

During the last two weeks crops in Missouri have made reasonably good progress, though a good soaking rain would be of great benefit.

GREAT PLAINS AREA (South to North).

OKLAHOMA, TEXAS, NEW MEXICO, AND KANSAS

Woodward Field Station, Woodward (John B. Sieglinger).

Observations made on trip from July 13 to 20, by John B. Sieglinger.

From Woodward to Dunlap, Okla., the crops this season are about 2/3 wheat, all of which was harvested, mainly headed, the remainder of the crops being grain sorghums rowed, and a small patch of sowed feed on practically every farm. From Dunlap, Okla., to west of Buffalo, Okla., harvest was not completed as some fields of wheat were dead ripe but still standing. Shortage of labor seemed to be the cause of the backward state of harvest, heavy rains had also interfered with harvest. In this part of Oklahoma, the acreage was at least 75 per cent wheat with a few fields of alfalfa, and sorghums both rowed and sown. Near Dunlap there were a few fields that had been left idle and had grown up in weeds.

West of Buffalo and near Gate, Okla., the wheat acreage increased, also the cultivated land. In this vicinity we observed at least 7 combine harvesters at work. Wheat was being hauled to town from the harvesters by truck. On inquiry we learned that this is the second season for the combines and that they are giving satisfaction. There are two makes in use, McCormick and Deering, costing about $1,600. They harvest about 35 acres per day, charging $6.00 per acre.

From Gate, Okla., to Guymon, Okla., wheat was the principal crop, headers and combines were busy. We saw one combine outfit pulled by a large tractor, and the grain wagon was hitched to the tractor. Two boys were running the outfit, one on the tractor, the other, on the harvester, also looked after the grain wagon. A man took care of the loaded wagons, hauled the grain to a grainary and shoveled it out. We examined the straw and it was doing good work.

Around Dalhart, Texas, they are slowly bringing more land under cultivation. At the Dalhart Field Station the sorghum project was in good shape. It was being thinned when we visited the Station. Good stands were obtained this year and some reliable results should be obtained.

From Dalhart, Texas, to Tucumcari, New Mexico, by rail we saw little cultivated land, all that was observed was in sorghums, mainly rowed.

At Tucumcari Field Station there were better prospects for good experimental results on the sorghum project than I have seen there at any previous visit. Thinning was to be started soon.

From Dalhart, Texas, to Boise City, Okla., there was quite an acreage of rowed sorghums, especially in Okla. There were also some fair fields of Indian corn. At one place south of Boise City we drove through a regular army of grasshoppers, moving from pasture into a corn field across the road.

About 18 or 20 miles northwest of Boise City we saw an irrigation project which a man has been working on for about 8 years. He has not put water on the land yet but has done a lot of work on the dam on the Cimarron river and on ditches. It is about 40 or more miles to a railroad from the project. There was not very much farming in that vicinity, though we saw several nice farm homes and small orchards.

North and east from Boise City, Okla., to Johnson, Kans., farming gradually increases. Rowed sorghums and running stronger to wheat as one gets into Kansas. The wheat was harvested by header but did not look extra heavy.

From Johnson, Kans., to Syracuse, Kans., sorghums and wheat were the principal crops, though the farms seemed to be scattering. From Syracuse to Garden City, Kans., wheat, milo, and sugar beets were the main crops grown, though there was also a large acreage of alfalfa.

At the Garden City Experiment Station, the grain sorghums were about two to three feet in height and growing rapidly. The second cutting of alfalfa was in cocks. By irrigating during the winter, good crops of milo are grown, averaging around 50 bushels to the acre. Farming around Garden City is done

under irrigation, and alfalfa, milo, wheat, and sugar beets are the chief crops grown. Alfalfa growing receives much attention as there is a ready market at the alfalfa meal factory. I understand they pay $17 per ton for the hay and it makes no difference how wet it is as the hay is all dried before being ground. Hay slightly discolored by rain can alsobe used. Some farmers were growing alfalfa exclusively. The sugar beet acreage was placed at 18,000 acres for the vicinity of Garden City. When we visited the sugar factory, it was being overhauled and cleaned for this fall's work.

From Garden City to Jetmore, wheat, milo, and kafir were the principal crops though there were not any large acreages of cultivated land until near Jetmore. At Jetmore they were receiving wheat from thrashers and combines. Between Jetmore and Kinsley, Kans., we saw some of the best improved farms of the trip, almost all the land was in wheat and the stacks of headed wheat were numerous.

South of Kinsley, Kans., there was more sorghum as the soil became sandier, and some Indian corn was grown. Near Protection, Kans., there was more wheat.

Between Protection, Kans., and Woodward, Okla., the cultivated land ran more to sorghums, though the country is rather rough in many places and not much farming is done except in several tracts of the tighter land.

Report of Cereal Project for last half of July, Woodward Field Station:

In contrast with the first part of July, the latter part of the month has been dry and the temperature high, as can be expected in this section.

The first date-sowing of broomcorn will be ready to harvest within a week while the second and third dates also are heading. Sparrows are proving a nuisance again this year, and we are going to attempt to poison them through their drinking water.

Practically all of the sorghums and broomcorn are beginning to head and a good rain is needed more than anything else at present. If rain does not come soon, the yields of sorghums and broomcorn will be greatly reduced.

The sixth date-of-seeding plats were thinned to stands during the last day.

Counting of plants has been done for all plats that were far enough advanced.

Excellent stands of the rate-of-seeding and method-of-spacing experiments of sorghums were obtained this season, and rain is now needed to give large yields for these experiments.

A number of hybrids are being made of various sorghums, and judging from last year's experience a good percentage of successful crosses should be secured.

Wheat thrashing is progressing throughout the county. The average yield seems to be around 9 or 10 bushels to the acre. $2.00 per bushel was the price being paid a day or so ago.

Maximum temperature for last half of July, 104° on July 23; the minimum was 58° on July 28. Precipitation for the last part of July 0.02 of an inch on July 17, and 0.03 of an inch on July 27, making a total of 4.59 inches for the month of July.

KANSAS

State Experiment Station, Manhattan (John H. Parker). The highest temperature at Manhattan was 104° on July 24, and the lowest was 50° on July 12. A measureable amount of precipitation occurred on six days and the total for the month was 4.4. inches.

During the last week in July there were soaking rains in nearly all of the northern half of the state, averaging from one to three inches. These rains were a great benefit to corn which now promises to be a bumper crop. Grain sorghums also are in splendid condition, with the possible exception of certain counties in the southwest where they are in need of moisture. The wheat yield over the state probably will exceed the last official estimate of the State Board of Agriculture, which was over 147,000,000 bushels., The quality is excellent in nearly all parts of the State. Most of the grain is testing more than 60 pounds and much of it will grade No. 1 hard.

The threshing of about 1,000 tests of wheat and oat varieties and of fertilizer plots from the cooperative work with farmers was completed on July 31, and oats and flax from the nursery are being threshed this week. Individual plant notes are now being taken on more than 10,000 F_3 winter x spring hybrids, and a large number of awnless rust-resistant types will be sown in the nursery this fall. It is expected that some of the promising spring types will be sent to one of the northern stations for trial. Notes are also being taken on plumpness and quality of grain from each of these hybrids plants and there are many promising lines which seem to have the chaff and color of the Marquis kernel combined with the winter type and rust resistance of Kanred.

Bagging an average of 50 heads in each of the 300 rows of F_3 sorghum hybrids has been completed and notes are now being obtained on leaf and stem characters.

Dr. H. B. Humphrey spent August 3 and 4 in Manhattan. Prof. Parker spent August 5 and 6 at Hays on grain sorghum investigations.

Table I gives yields of winter wheat varieties from plots at the Agronomy Farm. It will be noted that improved Turkey, formerly known as P706, heads the list, and that it is closely followed by Clark's Blackhull wheat, a selection made by a farmer in Harvey County. Kanred is 8th in order of yield, the average having been cut down seriously by the low yield of one plot out of the three. Nebraska No. 6 is again about equal to Kanred in yield. It will be noted that Minturki is about half way down the list and that Alberta Red, which has a superior grain quality, is lacking in yielding capacity. Several of the soft wheats, notably Harvest Queen and Nebraska Hybrid, No. 28, made good yields.

Table 1. Yields of Winter Wheat Varieties Grown on the Agronomy Farm, Manhattan, Kansas, in 1920.

Kan. No.	C. I. No.	Name	Bushels per Acre. Plot 1	Plot 2	Plot 3	Plot 4	Average	P.E.M.
2382	5592	Improved Turkey	32.52	28.74	37.62		32.96	± 1.85
343	6251	Clark's Blackhull	33.65	37.81	25.71		32.39	± 2.67
304	6202	Tauranian	33.28	35.92	27.23		32.14	± 1.95
2414	5880	P1068	32.52	36.30	26.85		31.89	± 2.01
1664	6472		37.41	28.36	28.36		31.37	± 2.41
19 *	6199	Harvest Queen	23.82	45.75	24.20		31.26	± 5.77
321	6249	Nebraska No. 6.	31.01	37.06	25.71		31.26	± 2.31
2401	5146	Kanred	32.14	25.33	36.30		31.25	± 2.37
34 * (c)	5147	Neb. Hyb. No. 28	22.56	37.06	35.54	27.60	30.69	± 2.75
284	6470	Malakov	31.01	37.43	23.44		30.62	± 2.86
2415	5879	P1066	29.49	34.79	26.85		30.37	± 1.75
373	6205	Defiance Hard Winter	32.14	24.20	34.03		30.12	± 2.35
570	1558	Turkey	28.74	29.12	30.25		29.37	± .35
382	6206	Kharkov	27.23	26.85	33.28		29.12	± 1.65
2464	6155	Minturki	29.49	35.29	21.84		28.87	± 2.81
846	6208	Crimean	29.12	21.55	35.92		28.86	± 2.90
2101 (a)	6213	Red Winter	30.62	26.47			28.54	± 1.73
35	1442	Kharkov	32.09	28.74	24.58		28.47	± 1.55
2411	1543	Beloglina	28.36	23.82	31.76		27.98	± 1.65
2084 *(c)	6211	Zimmerman	23.82	33.65	32.52	21.18	27.79	± 2.57
2048	5797	Alberta Red	27.23	23.44	31.76		27.47	± 1.71
2413	6474		27.98	32.14	21.93		27.35	± 2.15
2039	6473	Turkey	26.85	31.76	23.44		27.31	± 1.75
317 *(b)	6471	Fulcaster	27.23				27.23	
2409	6217	Turkey	29.12	20.80	31.38		27.10	± 2.51
2123	6214	Defiance Hard Winter	27.23	23.44	29.49		26.72	± 1.31
1443	6209	Kharkov	30.25	17.39	31.38		26.34	± 3.56
2412	2479	Romanella	26.85	21.55	30.25		26.21	± 1.85
2156 *	6215	Fultz	25.71	23.82	12.86		20.79	± 3.16
223 *	6200	Illini Chief	17.39	23.07	11.34		17.26	± 2.35

* Soft red winter wheats; (a) Two plats only; (b) One plat only; (c)Four plats.

Table 2 gives the yields of a few of the most interesting varieties of winter wheat grown in nine replicated rod rows in the Agronomy nursery. It will be noted that Clark's blackhull wheat made the highest yield and that an awnless wheat received from Sieger Wheeler from Canada is saidto be very winter hardy. Nebraska No. 6 made a good yield, about 3 bushels better than Nebraska No. 60. The 233 row plots of Kanred grown as checks throughout the nursery averaged 37 bushels, and of the 46 varieties or strains that yielded more than this check average, 25 were recent selections from Kanred P1066 or P 1068.

It will be noted that Minturki and Minhardi yielded very much better than Odessa and Buffum, which seems to favor the use of these varieties as parents in crosses for winter hardiness, rather than the older varieties Odessa and Buffum.

Table 2. Yields of Winter Wheat Varieties in the Agronomy Nursery (a), Manhattan, Kansas, in 1920.

Kansas No.	C. I.	Name	Bu. per acre.
306 (343)	6251	Clark's Blackhull	44.50
312 *		Wheeler's Awnless	40.61
321	6249	Nebraska No. 6.	39.85
2401 (b)	5146	Kanred, Average of all checks.	37.12
322	6250	Nebraska No. 60	36.63
19 *	6199	Harvest Queen	36.63
2253 *	1846-7	Zimmerman	36.17
304	6202	Tauranian	35.88
2123	6214	Defiance Winter	35.11
2382	5592	Improved Turkey	33.48
2181 *		Ghirka Winter	33.45
326	6156	Bacsca	33.25
2464	6155	Minturki	32.65
317 *	6471	(Mo) Fulcaster	31.71
2101	6213	Red Winter	31.59
2450	5149	Minhardi	30.88
2156 *	6215	Fultz	30.75
2472	5549	Montana No. 36.	30.58
2048	5797	Alberta Red	30.24
2195	5170	Awnless Hard Winter	29.79
34 *	5147	Nebraska Hybrid No. 28.	27.36
307 *	5580	Odessa	23.96
206 *	3330	Buffum No. 17	22.97

(a) Only a few of the more important varieties are included in this table.

(b) There were 46 varieties or strains that yielded more than the average of the Kanred checks. Of these, 25 were recent selections from Kanred, P1066, and or P1068, and 3 were selections of Hard Winter Defiance.

* Soft red winter wheats.

Fort Hays Branch Station, Hays (A. F. Swanson). The last rain, which fell July 15, amounted to 1.37 inches. Since that time the weather has been dry and ideal for threshing. Rowed crops that were well cultivated are still making good growth.

Threshing on the Cereal Project was completed July 21. The varietal experiment with winter wheat was replicated six times and the average yields are as follows:

Kanred,	C. I.	5146	35.9 Bushels
Kharkov,	"	6206	26.6 "
Turkey,	"	1559	25.8 "
P 1068,	"	5880	27.2 "
Improved Turkey,	"	5592	26.5 "
Alberta Red,	"	5797	28.9 "
P 1066,	"	5879	29.8 "
Defiance,	"	6214	29.3 "
Clark's Blackhull,	"	6251	33.1 "
Kansas Station,	"	1664	26.7 "
Tauranian,	"	6202	27.2 "
Red Winter,	"	6213	22.7 "
Malakov,	"	2908	27.3 "
Kharkov,	"	2193	28.0 "
Crimean,	"	1436	27.9 "
Kharkov Hays Nur	C.INo.	2	27.8 "
Kharkov " "	"	77	26.4 "
Turkey Hays Nur	"	44	27.2 "
Kharkov " "	"	78	27.6 "
Kharkov " "	"	35	25.2 "
Kharkov,	"	1442	26.0 "
Turkey Bot. Dept.	"	415	24.1 "
Mintuki,	"	6155	22.7 "
Nebraska,	"	6	26.4 "
Nebraska,	"	60	26.6 "
Pioneer Turkey (Local)			29.5 "

Kanred wheat is again the outstanding wheat in the varietal experiment and is 2.8 bushels higher in yield than Clark's Blackhull, its closest competitor.

The yields from the comparison of the furrow drill with the common drill are as follows:

Kind of drill and seedbed	1-Peck	2-Peck	3-Peck	4-Peck	5-Peck	Direction of Seeding.
Lister Drill	37.1	37.5	38.6	34.5	26.0	East and West
Fallow ground	38.1	39.7	38.5	35.1	34.2	North " South
Lister Drill	35.3	36.4	35.6	33.6	34.2	East and West
Stubble Ground	38.9	34.8	32.4	35.4	29.5	North " South
Average yield	37.4	37.1	37.0	34.6	31.1	
Common Drill	29.3	40.0	34.6	36.6	32.3	North and South
Fallow Ground	37.3	38.3	32.3	33.0	32.0	East and West
Common Drill	28.5	30.8	32.6	31.6	36.0	North and South
Stubble Ground	35.0	31.5	33.6	31.3	28.3	East and West
Average yield	35.0	35.2	33.3	33.1	32.2	

It is to be noted that the low rate of seeding gave the highest yields. This experiment was seeded September 25 and vigorous stooling took place.

Sorghum varieties such as Freed, Manchu brown kaoliang, Early white milo and feterita began heading from July 16 to 20. Early selections of Dawn kafir are just headed. A large number of heads from a cross between Red amber and feterita have been bagged. Another promising cross is one between Freed sorgo and Pink kafir in which certain rows are showing types of Pink kafir with the earliness of Freed sorgo.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). Weather conditions in north eastern Colorado have been very unfavorable for harvesting during the past week. A total of over three inches of rainfall was recorded during the period July 25 to 29, at Akron Field Station. Considerable damage was done to cereal crops which had not been harvested, as the heavy rains during this period were accompanied by strong winds. Much of the grain was badly lodged.

The winter wheat crop of northeastern Colorado is the best that has ever been harvested. Many fields are yielding better than thirty bushels to the acre. A field of about thirty acres of Kanred, C.I. No. 5146, yielded better than thirty bushels to the acre on ground that had been cropped to corn the previous season. The highest yield so far reported is approximately 50 bushels per acre from a 24-acre field. The use of the combined harvester and thresher is becoming more common each season in this section of the Great Plains. Automobile trucks are also gaining steadily in favor. Many farmers are converting their used cars into trucks. So far there has been no shortage of cars in which to ship wheat from this section of the state. The quality of the wheat this season is very good, much of it testing from 61 to 63 pounds to the bushel.

While the recent precipitations have been unfavorable for harvesting wheat, they have practically assured the production of a good corn crop in eastern Colorado. Much of the corn in this locality is fully tasseled and the ears are silked. From present indications there will be many fields of corn in this section of the state that will yield at least 40 bushels to the acre.

Forage crops are growing vigorously. Many fields of sorghum have started to head. Millets and prosos are growing well. One farmer in this locality has sown a field of about 80 acres to proso.

Potatoes are producing exceptionally well this season. So far there has been no great amount of damage done by potato beetles. Many gardens have suffered severely from the ravages of the Harlequin cabbage bug. The second brood of these bugs has made its appearance.

Work on the Akron Field Station is being seriously delayed on account of the recent heavy rains. Very little harvesting has been possible during the past week as the ground has been too soft to run the binder. Many of the winter wheat plats which have not as yet been harvested, are becoming very ripe. About one-third of the plats have been harvested. Possibly one-half of these which still remain standing are ripe enough to cut. With favorable weather conditions we hope to have the plats of this Office all harvested by the end of the first week in August.

Harvest of nursery grain started July 30. About one-tenth of the nursery has been harvested. The damage done by the torrential rains of last week was much greater, proportionately, in the nursery than in the plats. The soil upon which the nursery is growing is rather low and as the recent rains were accompanied by high winds much of the nursery grain was blown down.

All of the corn and sorghum plats are growing well. Pearl flint corn is the farthest advanced. The kernels are in the blister stage. Manchu Brown kaoliang has started to head. This is an earlier sorghum than is the Dawn kafir.

C. W. Warburton of the Office was a station visitor Saturday, July 24. The various projects of the Office were inspected, and a short trip was made through the country near Akron Field Station.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). The past month has been very propitious for crop production. While there has not been quite the average rainfall, the excessive moisture which fell during the latter part of June has been ample to sustain the crops in good growing condition to the present date. However, rain will be needed in the next few days for nearly all crops. The precipitation for the past month amounted to 1.25 inches, .37 inch coming on the 8th and .86 inch on the 26th. These constitute the main rains for the month. The temperature has been quite mild. It has been slightly below normal, the maximum, 95 degrees, occurred on July 22 and the minimum, 43 degrees, on July 7.

The winter wheat is looking well and a few of the glumes are turning yellow. The spring grains are in good condition. On the whole, the straw will be rather short, except the barleys which are making an unusual growth. The flax is in full bloom; the early oats are practically all headed out and the mid-season oats are coming into head. The first tassels of early corn and a few sunflower buds have appeared. As forage crops are of vital importance in this region, it may be well to note that the growth of the sunflower exceeds that of the corn and bids fair to produce considerably more silage

per acre. The prairie grass is beginning to cure and the cattle on the range are in excellent condition. Most forage crops are making good growth.

The work at the station for the past month has consisted mostly of the various processes of weeding.

Sheridan Field Station, Sheridan (R. S. Towle). No report.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzell). Harvest is well under way on the station grounds. Most of the rye and oats and some wheat has been cut. While some of the earliest seeded flax has been pulled, most of the flax will not be ready to harvest for several days.

During the past week Doctors H. B. Humphrey and A. G. Johnson, Messrs. C. S. Reddy, J. Allen Clark, J. H. Martin, T. R. Stanton, H. Howard Biggar and others were visitors at the station.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.). The last half of July has been very warm and dry except for a rain of 1.07 inches recorded July 31. Maximum temperature for the last half of July was 103° recorded July 23; minimum, 52° recorded July 31; precipitation, 1.07. Cereals and flax have been ripening very rapidly. Even the corn, which up to the middle of the month looked exceptionally well, began to fire before the rain came.

All of the oat varieties except White Russian, all of the barley varieties, and Kota, Marquis, and Preston wheats have been harvested. White Russian oats and the durum wheat varieties in plats are ready to harvest now.

Khapli emmer and Prelude, Ruby and Marquis wheats in the wheat nursery have been harvested. Though there is very little rust on the wheat varietal plats, there is a high percentage of stem rust on most of the common wheats and some of the durums in the wheat nursery, which was sown late and in a low, damp spot. Kota is conspicuous for its practical freedom from stem rust while Marquis, Preston, Power Fife, Hayses Bluestem, Prelude, Ruby and the hybrids between Kubanka and Preston and Kubanka and Haynes are severely rusted. Of the durums, D-5, Acme and Monad are almost free from rust, while some of the Kubankas and Arnautkas, especially Kubanka, C.I. No. 4063, and Arnautka, C.I. No. 4064, are badly rusted.

Flax varietal plats and rates and dates of seeding are nearly ready to harvest. The special selection of fiber flax grown here for increase is almost ripe enough to harvest and looks very well.

Mr. Howard Biggar, Associate Editor of the Dakota Farmer visited the station July 20. Mr. J. Allen Clark was here July 28. Dr. H. B. Humphrey and Dr. A. G. Johnson were here July 30, and Mr. T. R. Stanton was here July 31.

Dickinson Substation, Dickinson (Ralph W. Smith). Hot, dry weather during the latter half of July has caused rapid development and ripening of the cereal crops. Early varieties of oats and barley and Prelude Wheat were harvested this week. There is prospect of good yields of all the cereals

although not quite so good as conditions indicated two weeks ago. From the first of June till the middle of July rains were frequent and sufficient for the needs of the crops but the subsoil being comparatively dry, the lack of rain in the past two weeks has prevented the bumper crop that was expected.

There is some stem rust on wheat and barley but apparently not enough seriously to affect the yields.

Some harvesting has been done in this locality and by the middle of next week it will be quite general.

The maximum temperature for the month was 98 degrees. The precipitation was somewhat over 2.5 inches, most of it occurring in the first half of the month.

J. A. Clark visited the Substation July 26 and 27.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May), July 17. Practically all of the winter wheat in the replicated plats is fully headed except Buffum No. 17 (C. I. 3330). The same is true of all winter wheat throughout this section. The selections in the winter wheat nursery have been heading since July 5 and there are several yet to head, notably selections from the Buffum X Ghirka Winter cross, which are very late.

Spring wheat has tillered excessively and in consequence, if we should have a prolonged drouth now, the yield would be cut severely. Prelude, C. I. 4523, has headed and several other varieties are in the first booting stage. Some of the new varieties are showing up good, notably Ruby, C. I. 6047, and Khala, C. I. 5529. Peliss, C. I. 1584, is looking fine.

Among the barleys, Mariout, C. I. 261, Coast, C.I. 690, and Himalaya, C. I. 620, have headed and several other varieties are in the boot of flax varieties, N. D. R. 52; C.I. 8, and Montana Common, C.I. 6, have bloomed, which also is true of Burbank flax in the cereal nursery. The earliest varieties of oats also are heading.

The precipitation for the first 15 days of the month was .85 of an inch which is a little below normal. Nothing is suffering for moisture yet, but if the present warm weather continues it will not be long until spring wheat and barley will be needing rain.

Mr. Oakley and Mr. Westover of the Office of Forage Crop Investigations, were here July 2. Mr. Woodward of the same Office is here in connection with his work of putting up alfalfa hay. A county agents meeting will be held here the fore part of next week.

July 31. The precipitation for July was .88 of an inch, practically all of which fell during the first half of the month. The average precipitation for July in the past 22 years is 1.92 inches, which is more than twice that of the past month. The maximum temperatures of the last half of the month have been in the 80's most of the time.

The hot dry weather of the past three weeks has cut the winter wheat yields fully 25 to 30 per cent from earlier estimates. The weather is causing winter wheat and the earlier varieties of spring cereals to ripen prematurely. If the present weather continues we will be harvesting the winter wheat the last of this week or first of next (August 6-10).

Heading notes are about completed except in the spring cereal nursery. I will take height and dates of maturity this week and also complete, as far as possible, rogueing the plats. The winter wheat plats have considerable volunteer Kharkov, C. I. 1583, along one side of the series.

Our annual picnic was very successful, the attendance being about 3,000 to 3,500.

Mr. J. A. Clark happened to be here the day of the county agents meet and gave the men some useful and interesting information concerning the wheat varieties. He left here for Dickinson, N. Dak., on July 25.

WESTERN BASIN AND COAST AREAS
(South to North and West)

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). No report.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman Co. Branch Station, Moro (D. E. Stephens). No report.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). Dr. Ruth F. Allen has completed at Berkeley a number of oat crosses for smut and rust resistance in connection with studies of stem rust of oats.

Smut counts have been completed at Davis on 1912 sowings. The counts consisted of both smutted plants and smutted heads. In many rows all the plants were smutted but some smut-free heads always appeared. In order to pull the plants separately the plots had to be irrigated just before the counts were made. An electric pump was available at all times, making irrigation possible.

No significant differences were noted between the early November and the mid-December dates of sowing smutted varieties. There were many varieties

only slightly smutted but the following were found immune from bunt (Tilletia tritici):

Martin Amber,	C.I. 4463	Turkey Red,	C.I. 1558
Red Hussar,	C.I. 4843	Crimean,	C.I. 3055
Wash. hybrid,	C.I. 330	Khapli emmer,	C.I. 4573
Wash. "	C.I. 332	" "	C.I. 4013

Smut counts on 576 surviving plant experiments with 40 varieties gave some very resistant survivals and one immune selection. Further experiments with this method are arranged for the coming year.

Seed treatments for prevention of bunt (T. tritici) were grouped under solutions, solvents and dusts. Some of the solutions gave excellent results. Some of the dusts proved very efficacious against seed-borne infection and were free from the objectionable seed injury common to solutions. The solvents mostly were failures.

Experiments with fungicides to prevent bunt.

Solutions.....	178
Solvents.....	36
Dusts.....	24
Experiments to prevent soil infestation	120

The fungicides used to prevent bunt infection from the soil were only partially successful.

Extremely severe winds have shattered all wheats and barleys liable to shattering. This has given excellent opportunity to secure full notes on wind shattering for each variety. Eastern United States and European barleys and wheats were shattered more severely than those from arid regions. Severity of shattering ranged from zero to 100 per cent in both wheats and barleys. Resistance to shattering was marked in the hybrid barleys bred for this purpose. Shattering appears to be an inherited factor and is dominant over resistance to shattering.

The cereal plots at Eureka are still green but have not suffered from drought. Oats were attacked by aphids, mildew blast, stem rust, crown rust and purple leaf, wheats by stripe rust and mildew, and barleys by leaf rust.

The grass garden at Berkeley, conducted in connection with the cereal rust investigations, is in excellent condition. Most of the grasses have been harvested and herbarium specimens gathered. Considerable rust and some smuts were found.

The plots at Salinas have been harvested and notes taken. Several superior barleys appear and some varieties of oats gave good results. The drought reduced the yields on all but a few of the earlier varieties of oats but the barleys and wheats were very little affected.

All the wheats were badly attacked by Hormodendrum cladosporioides which ruined what would otherwise have been excellent yields.

Fred N. Briggs has departed for Aberdeen, Idaho, to harvest and record smut counts on oats grown at the cereal substation. Enroute he visited the experiment stations at Pullman, Wash., and Moscow, Idaho, where cereal smut investigations are being conducted.

Plant Introduction Station, Chico (V. H. Florell). No report.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION)

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Vol. 12. August 20, 1920. No. 19.
Personnel (Aug. 11-20) and Field Station (Aug. 1-15) Issue.

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PERSONNEL ITEMS

Dr. C. R. Ball, Cerealist in Charge, will leave Washington on August 22 for an 8-day inspection of corn rot research in Indiana and Illinois.

C. E. Chambliss, Agronomist in Charge of Rice Investigations, left Washington August 13 for an extended trip in the rice growing area in connection with his field experiments.

J. Allen Clark, Agronomist in Charge of Western Wheat Investigations, returned to Washington on August 14, having completed his summer's work in the West. He and Mr. Martin will soon resume their work of completing the classification of commercial wheat varieties.

Dr. G. H. Coons, who has been under appointment as field assistant in barberry eradication during the month ending August 18, has resumed his position as plant pathologist in the Michigan College and Station and collaborator of this Office.

Raymond Fogelman, Assistant Pathologist in black rust investigations in Minnesota, has resigned effective August 15, 1920. Mr. Fogelman's mother is ill and it is necessary for him to give up his official work in order to take care of her.

James Godkin, formerly under appointment in this Office as Assistant Pathologist, was appointed Field Assistant on cereal disease control, with headquarters at Madison, Wisc. Mr. Godkin has recently completed a year's post-graduate course at the University of Wisconsin.

J. M. Hammerly, fof Corn Investigations, has spent several days recently in his corn breeding plats at Round Hill, Virginia.

Dr. H. V. Harlan, agronomist in Charge of Barley Investigations, returned to Washington on August 14 from his studies of kernel development at the Aberdeen Substation, Aberdeen, Idaho.

Dr. Annie May Hurd is spending her annual leave at Sydney, Cape Breton Island, Nova Scotia.

Dr. F. E. Kempton, Pathologist in Charge of barberry eradication, left Washington at the end of the first week in August for a round trip through the eradication area, but expects to return to Washington about August 27.

Dr. C. E. Leighty, agronomist in Charge of Eastern Wheat Investigations, returned on August 19 from a second trip to New York State in connection with the interpretation of cooperative field experiments.

R. W. Leukel left Washington on August 19 to visit points in North Carolina, Georgia, and Ohio for the purpose of making a special survey in those States for the location of the nematode disease of wheat. He may also visit certain points in Tennessee, Kentucky, Virginia, West Virginia, Maryland, and Pennsylvania.

Dr. E. C. Stakman writes from Edmonton, Alberta, on August 13, as follows: You may be interested in rust conditions in Canada. At Winnipeg rust (stem) is heavy - up to 85 per cent, but it is not doing great damage, except to late wheat.

Saskatoon and 40-mile radius. Barest trace of stem rust. There is a severe drought, w wheat often not more than 8 anches high- no chance for rust damage.

Edmonton and 30-mile radius. Bare trace of stem rust on wheat, barley and oats, grains fine, moisture plentiful - no chance for rust damage.

Evidently rust peters out north and west. Barberry at Winnipeg showing fresh ascia on August 9. Rust at Saskatoon and Edmonton must have blown in from South and East.

I gave up Peace River trip because I could have spent only two days or less at best and that hardly justified expenses. I have a boat reservation for Alaska, Skagway, Aug. 21. Trains only run to Peace River twice a week. Prof. Fraser and Mr. Newton of Alberta University went and will write me about any possible rust they may find.

T. R. Starton, assistant in Oat Investigations, who has been helping Mr. Warburton in the study of the breeding and classification oat nurseries at the Aberdeen Substation, expects to leave there on August 25, on his return to Washington via Kansas, Missouri, and three days annual leave at Cumberland, Md.

Leo R. Tehon, who has been employed as Assistant Pathologist and State Leader in barberry eradication in Illinois, has resigned, effective August 31, 1920. Mr. Tehon has accepted a more lucrative position in a nursery company at Shenandoah, Iowa.

C. W. Warburton, Agronomist in Charge of Oat Investigations, left the Aberdeen Substation on August 19 en route to Washington by way of the field stations in the Northern States. He probably will reach Washington very early in September.

John C. West, Field Assistant in the barberry eradication campaign in Minnesota, has resigned effective August 13, 1920, on account of the death of his father which made it necessary for him to take charge of the estate.

J. Milford Raeder, who was under appointment in this Office as Field Assistant in the barberry eradication campaign in Iowa, has been appointed collaborator, effective August 15, 1920. Mr. Raeder will continue his work as Assistant State Leader in Iowa, but his salary will be paid by the State of Iowa, according to the agreement with the Extension Division of the Iowa State College.

Misses Gartrell, Hall, Stevens, Todd, and Trauger, of the clerical staff, are all on vacation at this time.

MANUSCRIPTS AND PUBLICATIONS

Page proof of Department Bulletin 878, entitled "Varietal Experiments with Spring Wheat on the Northern Great Plains", by J. A. Clark, John H. Martin, and Ralph W. Smith, was read on August 17.

The manuscript entitled "Seed Corn", by C. P. Hartley, submitted with a view to publication as a revision of Farmers' Bulletin 414, is to be issued as a new bulletin under the title "Better Seed Corn". Galley proof was read on August 19.

Page proof of Farmers' Bulletin 553 revised, entitled "Pop Corn for the Home", by C. P. Hartley and J.G. Willier, xxxr was read on August 17.

A manuscript entitled "Control of Corn Root, Stalk, and Ear Rot Diseases" by James R. Holbert and George N. Hoffer was submitted on August 18 with a view to publication as a Farmers' Bulletin. It is to be made a special rush job in order that it may be used in selecting seed corn this fall.

The paper entitled "Injury to Seed Wheat Resulting from Drying after Disinfection with Formaldehyde", by Annie May Hurd, has been approved for publication in the Journal of Agricultural Research.

Galley proof of Farmers' Bulletin 1168, entitled "Varieties of Winter Wheat Adapted to the Eastern United States", by C. E. Leighty, was read on August 20.

Department Bulletin 823, entitled "Experiments with Kherson and Sixty-Day Oats", by C. W. Warburton and T. R. Stanton, was received on August 12. The date of issue printed on the cover is May 24.

[illegible] CONSTRUCTION

[illegible]

In the recently published paper by James G. Dickson and Helen Johann, in the Journal of Agricultural Research, vol. 19, No. 5, p. 235-237, an error occurs at the top of page 236. The first sentence reads: "The spores, both conidia and ascospores, behaved alike in germination." It should read: "The conidia from both conidia and ascospores behaved alike in germination."

In the Cereal Courier for July 31, 1920, vol. 12, No. 17, an omission was made on page 229. Following the heading, "Investigations of Foot-Rot or Take-all" should be entered "(H. H. McKinney, in charge)."

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). Capt. Kearsey spent most of three days with us last week, and seemed very much pleased with what we could show him. He selected a number of prints that he would like duplicates of. I will hold these until you arrive. He has requested me to locate and ship for him 100 pounds of seed rice of several varieties, leaving the varieties to me, but refusing Blue Rose, and especially desiring Fortuna and Acadia.

I had a very interesting trip down the river last week from Baton Rouge to New Orleans. Our rices are very popular there, and the demand for seed of Fortuna will be greater than the supply, I am sure. Landry has about one acre from seed I let him have, and he is expecting heavy yield, of about 28 to 30 bags. A neighbor wants 50 bags of seed, however Landry will not sell this year, as he wants a large acreage next season. I am receiving inquiries for seed, from this State and Arkansas. Today I received a request from a man in Arkansas, asking for a little if a large quantity could not be secured.

Practically the only crop between Donaldsonville and New Orleans, on the T. P. Ry., is rice. There are large fields near the S. P. where it crosses the River. If you can arrange to visit the river section soon after you arrive you will be able to see some of our rices before they are cut.

We have been having rain for nearly three weeks, have done one day's work with cultivator in this time. Some of the fields of beans are getting rather weedy, and the plants are showing the effect of the continuous water.

The rice plats are very good, and we have been able to get out all weeds. Harvest will begin on the large plats this week. The nursery is late, as it was not seeded until the middle of June; however a few new rices are heading. The fertilizer plats are very pretty, and the different fertilizers are "showing up" very nicely. The irrigation plats were practically ruined by sedge. The only results worth while will be from the different dates of application of irrigation water.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs).
No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Hartzwell).
No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). All threshing and fanning operations have been completed. Approximately 3000 rod rows of wheat and rye were harvested and the yields of these are now being tabulated.

Under the supervision of Dr. C. H. [illegible], all whose varieties sown in plots this fall are to be treated by the hot-water method to prevent smut. The results obtained from treating with hot water and formaldehyde the barleys sown in 1919 were very satisfactory and this work is to be continued the present season, with some additions.

The 1920 rye yields from twentieth-acre plots were as follows:

Variety	C.I.No.	Bu. per A.	Wt. per bu. (lbs.)	No. Plots
Abruzzi	40	36.5	54.5	4
Rosen	135	36.3	51.8	2
Giant Winter	30	35.2	55.0	3
Win Hunter #1	133	44.6	54.5	1
Ivanof	34	34.4	55.0	1
Winter Rye	208	34.3	50.5	1
Rimpau	126	33.9	54.0	1
St. Johns	130	32.9	52.0	1
Henry	136	32.4	56.7	1
Win Hunter #1	175	30.4	53.0	1
Memleben	108	29.4	54.5	1
Va. Rye	128-1	22.9	52.5	1
Abruzzi	40-1	17.9	53.5	1

The 1920 yields from spelt and emmer were as follows:

Spelt	C.I.No.	Bu. per A.	Wt. per bu.
Red	1772	79.4	47.7
Alsatian	1770	74.9	50.5
"	3234	70.8	52.0
Bearded Winter	1764	68.9	50.5
Emmer			
Black Winter	3628	5.4	39.2
" "	2337	4.9	39.5

The emmers were badly injured by low temperatures during the winter.

[illegible]
Cornell University Experiment Station, Ithaca (H. E. Love). [illegible]

REPORT OF [illegible] TRIP THROUGH

[illegible]

[illegible], June 25 by [illegible] Highway through Middlesville, Cambridge City and Richmond, Indiana; Dayton, Xenia, Columbus and Zanesville, Ohio; Wheeling, W. Virginia; Washington, Pa.; Cumberland and Hagerstown, Md.; Harrisburg and Harrisburg, Pa., arriving at Trumbelstown, Pa., on June 28.

The corn in eastern Indiana and southwestern Ohio was appearing, as a whole, in fair condition. Many fields were noted where the stand was poor and the growth of the stalks was very irregular. Examinations of the young plants showed that much of the trouble was due to infected seed corn having been planted. Many fields were late planted and some were very weedy.

In the Cumberland Valley fields of very good corn were found, the weather and growing conditions having been favorable.

In the Lebanon Valley at Hershey, Pa., and in Lancaster County, Pa., the best stands and, on the average, the best-appearing corn was found. The corn, however, was planted late, and some fields had to be replanted. Sweet corn in the vicinity of Gettysburg was in fair condition.

Practically no scab was noted in any of the wheat fields in Dauphin and Lancaster counties. Over twenty-five fields were inspected by me and only occasional traces observed.

By observing the irregularity of growth of the plants in some fields as contrasted with that found in adjacent fields all along the route, it was very evident that some seed stocks were badly infected with organisms causing root rot.

During the weeks of the 10th and 17th, inspections were made of the experiments in progress at Mattituck, L. Island; Orange, Conn.; Hershey and State College, Pa.; Arlington, Va.; and Ithaca, N. Y. The work at Mattituck, Long Island, and in New York State is in charge of R. S. Kirby, of the Department of Plant Pathology of Cornell University. Mr. Kirby is studying the root-rot situation as it exists in the State. Using the improved rag-doll method of testing seed corn as developed cooperatively by the Office of Cereal Investigations, Prof. Kirby has found much infection in Luce's Favorite, the flint corn which is grown chiefly for silage in the State. Other varieties also have been tested, and the germination results indicate rather wide prevalence of infected seed stocks. Many fields in the State also show much irregular growth this summer.

Dr. Stoddard of the Department of Plant Pathology of the Connecticut Agricultural Experiment Station is conducting an experimental corn plat at Orange, Conn., on the farm of Mr. C. R. Treat. Two hundred ears of Stowell's Evergreen have been used in the experiment. The improved rag-doll was used to germinate the seed ears and to test them for fungous infections. Many of the rows in the plat planted from the infected ears show the symptoms of disease and are very irregular.

J. F. Adams of the Department of Plant Pathology, State College, Pa., is conducting the experiments at Hershey, Pa., and associated with him is H. W. Thurston, who is conducting experiments at State College, Pa. Seed treatment studies are being made at each place. Learning corn is being used.

At Arlington, Va., the experimental plat in charge of Cereal Office is being used for some physiological studies of both the soil and plants grown from various kinds of seed ears.

The return trip from July 20 to 24 through New York State [illegible] Canandaigua, and Rochester, gave evidence of much irregularity [illegible] growth

of many fields of flint and sweet corn. The fields of sweet corn observed seemed to be more irregular than the flint. Examinations revealed seed and early stalk infections in many of the stunted plants.

In northern Ohio the corn fields as a whole were good. Many fine looking fields of sweet corn were noted along Lake Erie.

Many fields in northeastern Indiana in the vicinity of Decatur and Huntington were very poor. Heavy rains and weeds will cause no little loss. Again, some fields were very irregular and the results of using infected seed stocks were very evident.

The entire survey showed conclusively that, along with troubles arising from the late planting of the corn, due to the unfavorable seasonable conditions, much of the corn is infected. This fact was especially noted when plants in adjacent fields of the same apparent age would be non-uniform in size and much more so than could be accounted for by differences in rotational practices. Proper care in the selection of seed stocks is imperative. The best soils in all of the localities studied had fields of corn showing many irregularities in growth due to the use of poor, infected seed.

INDIANA

Indiana Agricultural Experiment Station, Lafayette (H. S. Jackson and E. B. Mains). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). Thrashing of plats has been completed and nursery material has been stored inside until room on thrashing floor is available.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). Winter wheat in Missouri averaged 12½ bushels per acre and spring wheat is expected to make about the same average yield. Oats averaged 31 bushels and rye 13 bushels. The corn crop is doing quite well, though the first half of August has been dry and a good soaking rain would be very helpful. Plowing for wheat is delayed by lack of rain.

We are now working up the results of our varietal experiments and will complete them this month.

GREAT PLAINS AREA (South to North)

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). We have had several good showers or small rains during the first part of the month. These rains came at a very opportune time as the sorghums were needing moisture. Since then the crops have been making steady growth and the indications are for an average or better than average yield of sorghums and broomcorn.

The first date plat of broomcorn was harvested on August 6; it produced a high yield of good hurl and self-working brush. The second date plat was harvested on August 14. Its yield was not so high as it was burnt some in spots, thus cutting the yield and quality of brush.

The first two dates of kafir and milo were damaged to quite an extent by sparrows. The later dates are not affected so much by sparrows as fields on the Station and in the country are providing food for the pests.

All the sorghums are advancing steadily, either ripening or heading according to their date and earliness.

Yesterday, August 15, and today, August 16, Mr. Swanson and Mr. Halstead of Hays, Kans., and Mr. Keating of Garden City, Kans., visited the Station. They expect to accompany Mr. Chilcott and the writer on an auto trip to Lawton, Okla., starting this P. M.

The precipitation in August to date was 1.40 inches, which came in several showers, the most being 0.69 inch on August 11.

KANSAS

State Experiment Station, Manhattan (John H. Parker). No report.

Fort Hays Branch Station, Hays (A. F. Swanson). A four-inch rain on August 4 and 5 came just in time to greatly benefit all rowed crops and was especially helpful to some of the sorghums that had just begun to suffer.

Much fall plowing is being done throughout the central and western part of the State so that the outlook for wheat is very encouraging for next year. Threshing is well in hand in the southwestern corner of the State where the crop is light, but in the northwestern part much of the crop yet remains as there is a great acreage here with yields running from 20 to 35 bushels.

Fall plowing on the Cereal Project is now completed and the final preparation of the fallow ground is now being made. All of the sorghum plats and head-rows were labelled the first of the month. Preparation is being made to take extensive notes on the hybrid sorghums. One group of notes has already been taken in cooperation with Professor John H. Parker from the College.

Mr. A. L. Halstead, R. E. Getty, and A. F. Swanson left on August 9 for an extended trip into the southwest to become more familiar with experiments on sorghums in general.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). No report.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). To date the month of August has been very dry. The precipitation amounted to .5 inches. The most of this came in very small showers. The evaporation, while higher than that of July, was not excessive. The maximum temperature, 85 degrees, occurred August 10 and the minimum, 41 degrees, on August 11. The wind velocity has been very low, sometimes not above 2 miles per hour for a period of 24 hours. This may partly account for the low evaporation. Notwithstanding the low wind velocity, we have been able to more than keep our water supply tank filled.

The winter grain is nearly ripe, but it has been ripening very unevenly, delaying its harvest. The spring grains are looking fine. The early varieties of common spring wheat are beginning to turn yellow. About 50 percent of the early oats are ripe. The flax is producing a large yield of bolls. The corn is very short and unless the season is unusually protracted in the fall it will mature but very little grain. The sunflowers for silage in the general fields have made excellent growth and are withstanding the drouth remarkably well. A great many visitors are asking for information concerning the crops.

For the past 15 days the work at the station has consisted of weeding operations, repairing of machinery for harvest and in beginning the construction of a new silo.

NOTES ON MINNESOTA, NORTH DAKOTA, AND MONTANA (T. R. Stanton).

Aug. 5. As I am now en route to Aberdeen I will report briefly on crop conditions in the States through which I passed: At University Farm, St. Paul, Minn., an excellent crop of all the small grains will be harvested. The writer never has seen oats maturing in so perfect a condition. Stem rust of wheat is again seriously affecting the crop in many sections of Minnesota and the Dakotas according to experiment station officials and farmers. While very little rust was observed on spring wheat at St. Paul considerable was seen in the plats at Fargo.

Along the line of the N. P. Ry. in the Red River Valley of North Dakota early sown wheat was being harvested. The crop appeared most promising from the train, the stand was heavy and the plants were of good height. However, appearances may have been deceiving as the amount of rust present could not be ascertained.

In the vicinity of Mandan, N. D., the small grains suffered somewhat from the dry, hot weather which prevailed during July. Of the small grains durum wheat appeared to be best, some plats in the rotation series probably will make 20 bushels per acre.

In the vicinity of Dickinson, N. D., the best crops since 1915 will be harvested. Oat varieties in the experimental plats were maturing in excellent condition, and apparently high yield will be obtained.

Crop conditions in Montana generally are good, at least they are much better than during the last three years. In eastern Montana crop conditions appeared to be good. All vegetation was greener, in fact everything was looking more hopeful. It was noted that the promising condition of the crops was reflected in the increased activity and life of the people in the towns along the N. P. Ry.

In the Judith Basin crop conditions are good. Many thin stands of winter wheat were noted, due to winterkilling. However, where any kind of a stand came through the winter an excellent yield will be obtained. Spring grains are beginning to suffer for want of rain and if the dry weather continues their yield will be seriously affected.

Reports from the drought stricken areas in Montana in which Federal loans were made in 1919 indicate that a fair to good crop will be harvested this year.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzell). A survey of flax diseases was undertaken for the purpose of gathering data concerning flax production particularly as affected by the common diseases such as wilt, canker and rust. The opportunity to use the survey to apply directly upon specific problems now under consideration was not overlooked.

The following table taken from field notes shows points visited, diseases found, severity of infection, etc.

Town	State	Disease	Remarks
Dilworth	Minn.	wilt rust canker	
Fargo	N. D.	wilt canker rust	trace to 100% infection " " 20% " " " 100% "
Buchanan	"	wilt canker rust	" " " 7 fields visited
Jamestown	"	wilt canker rust	7 fields visited
Pingree	"	wilt	3% infection, 1 field visited
Windsor	"	wilt canker rust	3% infection trace trace
Alfred	"	wilt canker rust	trace " "

Hensler	N. D.	wilt	specimen sent in by owner
Sharon	"	rust	" " " " "
Mandan	"	wilt canker rust	
Dickinson	"	wilt canker	trace; 3 fields examined
Ambrose	"	wilt	specimen sent in by owner
Moccasin	Mont.	canker	3 fields visited
Havre	"	canker	3 fields visited
Plentywood	"	canker wilt	
Midby	""	wilt canker	no rust found
Williston	N. D.	wilt canker	no disease on irrigated land

Flax wilt was found as far west as Dickinson, N. D., Williston, N. D., and Plentywood, Mont. At Plentywood infection in one field was 10 percent. At Dickinson infection was very slight and farther west at Moccasin and Havre, Montana, no wilt was found in any of the fields visited. There was no wilt at Moccasin where land had been sown to flax continuously for the last five years.

Flax canker while apparently very much more severe in Montana was found at all points visited, the damage in commercial fields in eastern North Dakota being slight while at Dickinson and Williston, N. D., and Plentywood, Mont., the damage ran from moderate at Dickinson, more severe at Williston, and as much as 10 percent or more at Plentywood. Farther west at Moccasin and vicinity the damage was about 25 percent and at Havre as high as 50 percent or more in one large commercial field examined.

Flax rust was noted as to occurrence and severity. No rust was found west of Dickinson, N. D. All fields visited in western North Dakota and Montana were free from rust. Infection was severe in eastern North Dakota running as high as 100 percent in some fields examined. All fields visited in the Red River Valley were infected to a greater or less degree depending considerably upon the variety of flax grown.

Throughout the survey notes were taken on the different conditions favorable or unfavorable to disease as revealed by the field study and a search was made for different types of disease, particularly with reference to canker. Diseased specimens were collected and have been filed away in the flax disease collection at Fargo where they may be studied further this winter.

It is hoped that a more complete survey covering a larger area and extending over a greater number of commercial fields may be made in July of next year.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.). The first half of August has been generally warm and dry. The harvesting of all wheat, oats, barley, and flax in varietal and rotation plats was completed August 7.

A trip was made to Dickinson, N. D., and Moccasin, Montana, in company with W. E. Brentzel, Assistant Pathologist of this office, stationed at Fargo, N. D. On August 4 most of the flax at the Dickinson Substation was ready to harvest and looked in excellent condition compared with flax in other localities this year. Some flax about five miles north of Dickinson will, if harvested, without doubt give a higher yield of mustard seed than of flax. Considerable flax canker was found both in the Station plats and in the fields north of the town. A very little unmistakable wilt was found in a plat of late flax at the Substation but none at all in the fields north of the town.

At Moccasin, Montana, the flax was still green on August 7 but looked as though it might yield well with the aid of a little more moisture. Flax on spring-plowed land cropped to flax continuously for twelve years looked especially good considering the conditions under which it was grown. Though the flax was beginning to suffer from drouth in a drying out of the lower leaves, a very careful search disclosed not a trace of wilt.

Miss M. Weniger, Assistant Pathologist of the State Experiment Station at Fargo, N. D., visited the Station August 9 in the interest of the Plant Disease Survey.

A trip was made to Fargo, N. D., on August 16 and 17. Flax at Fargo looked much better than at Mandan. More moisture and the almost complete absence of Russian Thistles to contend with at Fargo are sufficient to account for the difference. The varietal test for wilt-resistance on diseased land gives results comparable to those at Mandan. Varieties showed similar degrees of resistance and susceptibility to wilt at both places.

Maximum temperature at Mandan for the first half of August was 95 degrees recorded August 10; minimum 45 degrees recorded August 12; precipitation, .59 of an inch recorded August 11 and 12.

Dickinson Substation, Dickinson (Ralph W. Smith). Harvest at the Substation is practically finished, all varietal and rotation plats being harvested except corn and proso millet. The harvesting of the nursery is also nearly finished. Farmers in this section are in the midst of harvest, and this week will see the greater part of it completed.

The hot, dry weather that had prevailed since the middle of July caused the rapid ripening of grain and yields will be somewhat less than expected, but in general yields will be better than in any year since 1915. Considerable stem rust developed in time to reduce the yields of late-sown wheat. There is also some rust in the barley but oats show only a trace of rust.

A rain of 0.85 inch on August 10 will greatly improve the condition of corn and millet, also late flax. There is comparatively little flax sown in this district this year. The flax varieties at the Substation were harvested a week ago and promise good yields.

Messrs. Brinsmade and Brentzel visited the Substation last week.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). The precipitation for the first fifteen days of August has been 0.91 inch, of which 0.68 inch fell on August 9, 10, and 11. These rains have delayed harvesting in this immediate section for a week or 10 days. However, harvesting will begin in earnest today while in the Lewistown section harvest has been in progress for a week or more.

The earliest varieties of winter wheat, barley, and oats on the Cereal Project were harvested last Friday (August 15) and the harvesting of all the varieties of winter wheat, barley, and possibly flax will be completed by the end of the week (August 21).

The recent rains and cool weather helped all crops, including winter wheat, although it was less beneficial to the winter wheat than the other grains. The rains and cool weather delayed ripening of the winter wheat, permitting it to fill out as much as possible. We expect good yields from the winter wheat. The midseason oat varieties will considerably outyield the earlier varieties this year.

Director Linfield of the Montana Experiment Station visited here on the 12th and Mr. Brinsmade of Mandan, N. Dak., and Mr. Brentzel of Fargo, N. Dak., were here on the 6th.

INTERMOUNTAIN BASIN AND COAST AREAS
(South to North and West)

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). July 1 - 31 (Received too late to be included in the preceding issue). During the first part of July the Station was given a final weeding which included roads, allies, fallow for all experiments, and peas, corn, and potatoes in the rotation tests.

Due to the late spring the cereals were about two weeks later than usual in ripening. The winter barleys, the first grains to ripen, were harvested on July 19, followed immediately by ripening and harvesting of Turkey in all cultural, cropping, and rotation tests.

The weather observations for July showed a maximum temperature of 100 degrees on the 22nd and 26th; the minimum temperature of 43 degrees occurred on July 1; the precipitation for the month amounted to 0.31 of an inch; and the evaporation measured 8.306 inches.

The visitors for July were Dr. F. S. Harris, Director of the Utah Experiment Station; Mr. S. R. Boswell, an employee of the Station during its

early history and now County Agricultural Agent for Summit County, Utah, with 25 farmers; Mr. C. W. Warburton of the Cereal Office; and Dr. J. A. Harris who is connected with the Carnegie Research Institution, in company with Dr. Gortner from the University of Minnesota, and two assistants, Mr. Valentine and Mr. Hoffman. These gentlemen, under the direction of Dr. J. A. Harris, collected leaves from most all winter and spring cereals for the purpose of determining the concentration of cell sap of crops grown under dry-land conditions. During the growing season samples were collected on three different dates, June 11, July 7, and July 19. Besides the visitors named, several farmers from the surrounding section have visited the Station this year, and all have expressed themselves as being very much interested in the work.

August 1 - 15. All harvesting of winter and spring cereals was finished on August 7. On August 10, we began threshing and have now finished all plats in the fertility and cropping experiments. Many of the plats given ordinary treatment have produced yields near 30 bushels per acre.

About half of the wheat in this section is harvested and both headers and combines are cutting the remaining part as fast as time will permit.

Buyers at Nephi are offering $2.00 per bushel for number one Turkey, but most of the farmers who have bins are storing for higher prices.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman County Branch Station, Moro (D. E. Stephens). Threshing began on August 4 and is progressing satisfactorily. With favorable weather, the threshing of the fields and experimental plats will be completed in another week.

The yields thus far obtained have been a little higher than was expected and, considering the light precipitation, in some cases are remarkably high. The total precipitation from September 1, 1919, to June 30, 1920, was 10.22 inches. The rainfall from March 1 to June 30, 1920, was only 2.66 inches.

In a combined rate and date experiment with Turkey winter wheat, the following results were obtained:

Rate, pks.	Sown 9/15 bu.	Sown 10/1 bu.	Sown 10/15 bu.	Sown 10/30 bu.
2	40.0	34.7	2-.7	24.3
3	43.0	39.0	29.0	25.3
4	40.7	37.3	26.0	22.0
5	49.0	39.3	25.0	21.0
6	42.7	36.3	26.3	17.3
7	45.0	40.3	27.0	22.3
8	49.0	37.3	29.3	25.7
Average	44.2	33.0	26.8	22.5

In the tillage experiments, yields of winter wheat after fallow range from 20 to 38 bushels per acre, depending upon the cultivation method used. Spring wheat yields are not nearly so high as those obtained from early-sown winter wheat. In the varietal experiment, Hard Federation has given the highest yield of any variety yet thrashed, 25.3 bushels per acre.

Mr. Woolman has completed making smut counts in the cereal disease nursery. Two years' data are now available on the smut resistance of the commercial wheat varieties of the United States under conditions prevailing at Moro. Comparatively few of the commercial wheat varieties show any resistance to stinking smut. A few varieties, however, have been discovered which not only are highly resistant to that disease but are apparently immune under our conditions. One of these varieties, Red Hussar, C. I. No. 4843, also came through smut-free at Davis, Calif., and Pullman, Wash., as well as at several points in Oregon. This year most of the commercial wheat varieties of the United States had more than 75 percent smut, based on head counts. The following varieties showed some resistance:

C. I. No.	Variety	Percent smutted heads
4463	Martin Amber	00.00
5294	Marquis	34.0
2997	Kofod	7.7
4651	White Odessa	00.0
4655	White Odessa	.7
4843	Red Hussar	00.0
5665	Miracle	11.3
1442	Kharkov	6.0
1558	Turkey	8.5
5146	Kanred	11.5

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). We have had good rice weather the past week, hot days and warm nights. Early varieties are heading and the later varieties are booting. The harvest will probably be at about the same time as in 1918 and 1919.

We have the water grasses pretty well under control. Have been over the place four times to date.

Water seems to be holding up real well, for I have heard of no complaints.

Agricultural Experiment Station, Berkeley (W. W. Mackie). No report.

Plant Introduction Station, Chico (V. H. Florell). Fairly good grain yields were obtained at the Chico Station this year. This was also true of a considerable number of commercial fields in the vicinity of Chico and other areas in the valley, while in other cases production was low. Probably the lowest yields were obtained from the light lands on the west side of the river.

The yield data recorded in the field plat experiments, which consisted wholly of wheat and barley, were very irregular and ununiform. This condition was due to the spotted ununiform soil primarily, although in the case of the wheat, formaldehyde injury was also partly responsible. In the wheat varieties unfortunately it is practically impossible to make comparisons. However, conditions were somewhat more favorable in a few of the most promising varieties. The yields of these are as follows:

Variety	C. I. No.	Bu. per A. (Av. of 2 plats)
Federation	4734	51.2
Pacific Bluestem	4067	45.0
White Federation	4981	44.6
Hard Federation	4980	42.9
Hard Federation	4733	40.9
Early Baart	1697	39.6

Somewhat more favorable conditions obtained in the barley varieties. In a single unreplicated series there was fair uniformity. The four highest yielding varieties were: Beldi, C. I. 190, Trebi, C. I. 936, with 68.8 bu. respectively; Hannchen, C. I. 531, 65.0 bu.; and Mariout, C. I. 261, 60.0 bu. In this connection it may also be stated that County Agent Drobisch reports that the California Mariout barley, distributed by Prof. G. W. Hendry of the University Farm, Davis, Calif., of which a number of commercial fields were grown in this vicinity, produced consistently higher than the common Coast barley.

The cereal nurseries were fairly uniform and good results were obtained, although the data has not yet been worked over. In the Federation group consistently high yields were produced in each of the replicated series.

Temperatures have been very hot and disagreeable now for about a week. Cooler weather would be most welcome.

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C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture.
(NOT FOR PUBLICATION)

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Vol. 12 August 31, 1920 No. 20
Personnel (Aug. 21-31) and Project Issue.

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PERSONNEL ITEMS

Carleton R. Ball, cerealist in charge, returned to Washington August 31, from a 10-day trip to Indiana and Illinois, where he inspected experiments for the control of corn root, stalk, and ear rots at Wanatah, Battle Ground, LaFayette, Linden, and Shelbyville, Ind., and Bloomington and Urbana, Ill.

Edwin B. Bothe, who has been employed as field assistant in the barberry eradication campaign in Minnesota, has resigned, effective August 13, in order to accept a teaching position in Wadena, Minn.

Ralph A. Carroll, field assistant in smut control work in the State of Illinois, has resigned, effective August 14, in order to accept a position as business manager for the Alabama Sunday School Association.

Stanley P. Cearle, field assistant in the barberry eradication campaign in Indiana, has resigned, effective September 4, in order to resume his studies at Purdue University.

Prof. Manley Champlin, extension agronomist of South Dakota State College and collaborator with the Office, has resigned to accept the position of Senior Professor of Field Husbandry at the University of Saskatchewan. Previous to Professor Champlin's appointment as extension agronomist last spring, he was for several years associate professor of agronomy at the South Dakota College of Agriculture and experiment station, and was closely connected with the cooperative cereal experiments in South Dakota.

Roall C. Cole, who has been employed as field assistant in the barberry eradication campaign in Indiana, has resigned, effective September 7. Mr. Cole expects to resume his work as a student at Purdue University.

Elmer C. Faris, Jr., has been appointed field assistant in the barberry eradication campaign in Nebraska. Mr. Faris has been a student for the past two years, taking special work in Agriculture. His appointment is effective August 23, 1920.

Watson E. Fowle, field assistant in the barberry eradication campaign in Michigan, has resigned, effective August 30, to accept a teaching position.

Prof. Edward F. Gaines, plant breeder at the Washington Agricultural Experiment Station and agent of this Office in the cooperative breeding of smut-resistant wheats, has resigned, effective August 31, to continue graduate study at Harvard University.

P. Denton Joseph, who has been employed as field assistant at Iowa State College, Ames, Iowa, in connection with cereal smut investigations, has resigned, effective August 30, the work for which he was appointed having been completed.

Dr. F. E. Kempton, pathologist in charge of the barberry eradication campaign, returned to Washington August 26 from an inspection of the field work in barberry eradication.

Dr. C. E. Leighty left Washington August 28 for points in Illinois and Missouri in connection with eastern wheat investigations. He consulted with Messrs. McKinney and Tapke at Granite City, Ill., on August 30, with regard to varieties of wheat to be used in flag smut and take-all experiments.

Merritt N. Pope returned to Washington August 23 from a two months trip in the interests of barley investigations, most of which time was spent at the Aberdeen Substation, Aberdeen, Idaho.

William F. Rooney, who has for the past year been employed in this Office in connection with eastern wheat investigations, has been transferred to the Bureau of Chemistry, effective August 22.

Prof. Edwin G. Schafer, Professor of Farm Crops at the Washington State College, has been appointed agent, effective September 1. He will continue the cooperative experiments in breeding smut-resistant wheats in place of Prof. E. F. Gaines, resigned.

Jerome P. Sexton, field assistant in cereal investigations at Arlington Farm, has resigned, the work for which he was appointed having been completed. His resignation is effective August 31.

John B. Sieglinger returned to his station at Woodward, Okla., on August 20, from an automobile trip to the Lawton Field Station, Lawton, Okla., in company with Mr. E. F. Chilcott, and Messrs. Hallsted and Swanson of the Hays Branch Station. He reports that in general, crop conditions were favorable in the section visited.

T. R. Stanton returned to Washington August 31 from an extended trip in the central and western States, including two weeks at the Aberdeen Substation, Aberdeen, Idaho, in the study of the extensive oat experiments there. The return trip from Aberdeen was made by way of Hays and Manhattan, Kans., and included a few days' leave at Mr. Stanton's former home in western Maryland.

Ernest L. Stover, field assistant in the barberry eradication campaign in Ohio, resigned August 31, to resume his college studies.

R. B. Streets, who has been employed as assistant pathologist in the barberry eradication campaign in Montana, has resigned to take post-graduate work at the University of Wisconsin, his resignation being effective July 24, 1920.

Miss Marie L. Teagle, stenographer and typewriter, was transferred from the States Relations Service August 23, and has been assigned to the administrative project.

C. W. Warburton returned to Washington August 31 from a two-months trip, during which he visited many of the field stations of the Office of Cereal Investigations. He joined Dr. Ball at Bloomington, Ill., August 28, in the inspection of corn rot experiments there and in consultation with officers of the Illinois Agricultural Experiment Station at Urbana, relative to future cooperation.

Allen P. Willis, field assistant in cereal investigations at Arlington Farm, has resigned, effective September 8. Mr. Willis will continue his studies at Swarthmore College, Pennsylvania.

Lyle M. Wilson, who has been employed as field assistant in the barberry eradication campaign work in Michigan, has resigned, effective August 30, to accept a teaching position at Adrian, Mich.

Ferdinand S. Wolbert, a graduate of the University of Montana and a graduate student at the Missouri Botanical Garden for one year, has been appointed field assistant in the smut control work with headquarters at St. Louis, Mo. He will succeed Ralph A. Carroll, who has resigned.

Clyde M. Woodworth, who has been employed as assistant plant pathologist at Madison, Wis., in connection with cooperative investigations of flax diseases, has resigned, effective September 30. Mr. Woodworth has accepted a position with the Department of Plant Breeding at the University of Illinois.

VISITORS

Dr. Etienne Foex, the French pathologist who has been visiting a number of the experiment stations in the Central West, returned to Washington August 27. On August 29 he left for southern points, particularly South Carolina, to become familiar with certain diseases of the crops in that section. He returned to Washington on the morning of September 1 and left that evening for New Brunswick, N. J., and Ithaca, N. Y. From Ithaca he was to return to New York City and take passage September 8 for France.

Raymond Fogelman, formerly assistant pathologist, who has been assisting Dr. E. C. Stakman in stem rust investigations at St. Paul, Minn., called at the Office on August 20. Mr. Fogelman has resigned, effective August 15.

PUBLICATIONS

Page proof of Farmers' Bulletin 1141, Rice Growing in California, by Charles E. Chambliss, was read August 28.

PROJECT REPORTS

218. CEREAL DISEASE INVESTIGATIONS.

(Dr. H. B. Humphrey, Pathologist in Charge.)

218-A. INVESTIGATIONS OF ILLINOIS AND SIC FUNGI.

(Dr. A. G. Johnson, Pathologist in Charge.)

Corn Root Rot Investigations, LaFayette, Ind. (Dr. George M. Hoffer). During the past month J. F. Trost has completed his hand pollinations at Shelbyville and Wanatah, Ind. Mr. B. H. Duddleston has also finished his breeding studies at Forest, Ind. Over 1,500 crossed and selfed ears have been obtained. These will be used next year to continue the breeding and physiological studies being made in connection with the corn disease investigations.

Prof. L. H. Heimlich has been employed to assist in preparing histological material for more intensive study of disease symptoms.

Mr. Ira Baldwin is continuing his soil studies. The soil reactions in various fields showing disease are showing wide variations.

Dr. C. R. Ball was a visitor during the latter part of the month. Inspections of the various experiments at Wanatah, LaFayette, Linden, and Shelbyville, Ind., were made. At Shelbyville, the experiments were especially interesting where bulk plantings were made using diseased and apparently disease-free seed ears as determined by the modified rag-doll germinators. The plats planted with the diseased ears were showing marked symptoms of the root rots.

Mr. R. S. Kirby, Instructor in the Department of Plant Pathology, Cornell University, is spending the week of September 1 at LaFayette studying the results in the experimental plats and the laboratory methods used in connection with the disease investigations. Mr. Kirby is in charge of the corn disease work in the State of New York.

[illegible] BARBERRY ERADICATION

(Dr. H. B. Humphrey, Pathologist in Charge.)

BARBERRY ERADICATION CAMPAIGN

(Dr. E. E. Hemmen, Pathologist in Charge.)

COLORADO: Agricultural College, Fort Collins (John P. Fitzsimmons). The irrigation company property in Fremont County has been cleared of all barberry. Most of the scattered bushes apparently had developed from seeds carried by birds but in several cases the seeds probably were carried by irrigation water. Arrived August 3 in the planting of Berberis fendleri; found bushes growing on both sides of the mountains near South Fork, Colo., and north of Pagosa Springs, Colo. Under separate cover I am sending specimens of both B. fendleri and Mahonia repens, heavily infected with rust, for determination. The infection is quite old. The grass does not seem to show any infection. Arrived at Hesperus August 8. After scouting the hills around Durango and north and west to Hesperus have found Berberis fendleri growing in nearly every gulch and valley through this range of mountains. It grows everywhere at about the same altitude. Between Durango and Pagosa Springs it is plentiful and in most places is infected with an aecial stage of a rust. The farmers report that it is very seldom that black stem rust bothers them. I inspected several wheat and oat fields and they did not show any evidence of this disease. In the hills west of Pagosa Springs grass was found that was slightly infected.

ILLINOIS: State Entomology Building, Urbana (L. R. Tehon). During the month of August a thorough survey of Stephenson County was completed and some work was done in Winnebago County. The scouting of Stephenson County progressed somewhat slowly because it was found advisable to scout every bank of the numerous streams and to make a thorough survey of the timberland, which covers a large area, in order that no bushes should be overlooked.

The field men began work in Winnebago County about the middle of August, having spent the first part of the month in Stephenson County. From all indications, many barberries are scattered throughout the county, especially in the vicinity of Rockford. The field men report that most of the bushes which they have located in the countryside surrounding Rockford have been scattered from an old hedge. The bushes in this hedge, which have infested the whole eastern part of the county, were brought to Illinois from Beloit, Wis., by an old settler about sixty years ago.

INDIANA: Purdue University Agricultural Experiment Station, Lafayette (H. S. Fawcett). The work in Indiana during the month of August has been confined to original ground survey and the checking up of removed plantings for sprouts. As reported in July, only a small percentage of bushes sprouting has been found. Two entire counties and part of another have been covered the past month, in which 31 plantings have been found. With the exception of two small wild areas, these were all ornamental plantings consisting of 1 to 175 bushes. In Noble County a number of large common barberries 25 to 30 years old were found, and upon inquiry we learned that a number of years ago a

nurseryman in that section of the State made a specialty of the common green-leaved barberry. It is very likely that we will find a great many wild and cultivated plantings in that section as a result of this nurseryman's work. In the July report mention was made of a severe outbreak of black stem rust in the vicinity of Vincennes, Knox Co., but no barberries were located there at that time. The guilty barberries, however, have been found, three bushes having been located on a farm in lower Vincennes township. These have been spreading infection to the surrounding fields for a number of years.

IOWA: Iowa State College, Ames (R. H. Porter). No report.

MICHIGAN: Agricultural College, East Lansing (W. F. Reddy). No report.

MINNESOTA: College of Agriculture, University Farm, St. Paul (Leonard W. Melander). During August, the work progressed quite rapidly. The only set back was that we lost one team in the middle of the month. When Lincoln County is completed, there will be a line of completed counties up to the Minnesota River on the South Dakota border. On September 1, one team is going to Martin County on the Iowa border to finish the survey of that county. We are endeavoring to secure another machine so that Faribault County can be completed during September.

The men have tested several ways of digging bushes. Farmers have loaned them horses or have even taken time enough to use their tractors. Two very good pictures were taken of the latter method. Mr. Curran hooked the Ford which he was driving to a bush and had good success in pulling it out.

Two hybrid bushes were found in the nursery of Wm. Pfaender at New Ulm. These bushes are striking intermediates between B. vulgaris and B. thunbergii. We have been unable to establish their susceptibility. Plans for further study have been made.

The State Fair demonstration is ready to be installed. All arrangements have been made for bushes, signs, and other educational features. The Fair opens Saturday, September 4. This is the best means for reaching the public and having an opportunity of showing people from Minnesota, the surrounding States, and Canada what we are trying to do with the barberry bush. They will be looking for this exhibit as the serious epidemic this year has opened their eyes to the rust situation.

MONTANA: State College of Agriculture and Mechanic Arts, Bozeman (H. E. Morris). No report.

NEBRASKA: College of Agriculture of the University of Nebraska, Lincoln (James A. Faris). During August, 800 escaped barberries were found around three large hedges, one each in Hall, Madison, and Saunders counties. The largest number of escaped barberries found in one vicinity was located at Norfolk. The hedge was part of an old nursery maintained by a cemetary association. A total of 200 escaped bushes more than one year old were grow-

ing along the shaded fence rows and in a pasture adjoining the cemetery. Five hundred seedlings were small and grew very close together under the lilac bushes and shade trees. Very few of these would have survived the winter, but the 200 escaped bushes more than one year old stood a good chance to reach maturity. The old hedge and seedlings were removed by field men and workmen for the cemetery company.

Escaped barberries found in the other counties were small seedlings and their development was no doubt encouraged by the present favorable season.

Publicity during the month included a leaflet issued by the Extension Department which strongly urges the removal of the common barberry bushes, demonstration material for three local eradication campaigns which are being made by banks and milling companies, and demonstrations for two county fairs.

Rural surveys have been completed in three entire counties and in parts of three others during the month. Excessive rain retarded progress somewhat during the middle of the month.

NORTH DAKOTA: Agricultural College, Agricultural College (George C. Mayoue). July and August reports.

(July report) During the month of July, 252 common and purple barberry bushes have been removed; 99 bushes were located in towns and 153 bushes in the rural districts. All bushes found have been dug by the field assistants who are scouting.

Having the scouts dig the bushes which they find does away with a lot of extra work in checking up the plantings to find out whether or not they have been carefully eradicated. In case a scout discovers a hedge which would take him considerable time to eradicate, he gets the owner to furnish men to dig the bushes and the scout assists and directs the eradication. So far, scouts have always received assistance in eradicating bushes when they have asked for help.

Even though the bushes are dug by the scouts, explicit records in duplicate of every planting and maps showing the exact location of the plantings are filed at this office. A record of the findings is also placed in the State Department of Agriculture.

As complete a publicity campaign as was possible with the small amount of funds allowed was conducted during the winter. With the inauguration of the summer's field work, our publicity campaign has continued to a much greater extent.

The field assistants are writing articles for the county papers concerning our work and giving instructions about the barberry and its identification and relation to black stem rust. The men talk with the farmers and townspeople about the barberry eradication and thereby a real propaganda has been started against the barberry in the counties where our work is being conducted. Also the scouts meet in conferences with the county agents, boys and girls club leaders, and other agricultural workers in the field.

During the month demonstrations for arousing an interest in barberry eradication have been put on at the State Fair, Fargo, N. D., Grand Forks Fair, Ramsey County Fair at Devils Lake, Cavalier County Fair at Langdon, N. D., and the Pierce County Fair at Rugby, N. D.

Through our demonstrations, 28 plantings have been located. For instance, a hedge of 75 bushes was located through the agencies of the Pierce Co. Fair and leads to plantings in Bowbells, Watford, Plaza and Deering, towns in the extreme western part of North Dakota, were located through information received at our booth at the State Fair in Fargo. The film, "The Barbarous Barberry," was shown at the State Fair. This film has been shown in several communities during the month.

With the exception of the last week, the weather has been very favorable for rust growth since July 15. There is a heavy infection of rust on all the late grain. Rust will cut the yield of the late grain to quite an extent this year.

(August report) Investigation of rust conditions near the barberry hedge which was found at Clifford, N. D., showed that the heaviest rust infection on wheat in that locality is near the hedge. A Marquis wheat field 40 rods from the hedge was very heavily infected with rust, in fact, the owner says that he will burn the crop as it is not worth harvesting. The fields farther away from the planting of barberry were less heavily infected with rust. A field of Marquis wheat sown about April 16, which is early for this year, located about 70 rods from the planting of barberry, was heavily infected with rust. The hedge was 15 years old and averaged 8 feet high. It showed a heavy infection and also bore a good crop of berries which were covered with infection. This is the first time that barberry bushes producing berries have been found in North Dakota since the campaign started.

OHIO: College of Agriculture of Ohio State University, Columbus (John T. Baringer). Our farm-to-farm survey has been checked considerably because of a lot of escaped barberries near Lewisburg, Preble County. I believe that the bushes, including seedlings, will number between 75,000 and 100,000. About 50 years ago a common barberry hedge was placed around an orchard adjacent to a stone quarry. About 20 years ago the hedge was destroyed as a result of anti-barberry propaganda which was circulating at that time. At the time the hedge was destroyed the barberries, of course, had had opportunity to spread for a great distance in all directions. The quarry happened to be near a creek and the creek runs through a limestone country. The barberries were growing from under and between the rocks and in dense tangles of underbrush. Eradication of these bushes seemed at first to be a formidable task, but investigation showed that for a number of years the farmers in this particular vicinity had been suffering severely from the black stem rust of wheat and oats, and were willing to lend assistance in the way of men and teams for the purpose of advancing our project. It was necessary to have one of our field men accompany each group of men in the eradication work to see that the digging was properly done. Greene, Van Wert, Preble, and about half of Montgomery counties have been covered in the farm-to-farm survey.

SOUTH DAKOTA: College of Agriculture, Brookings (H. C. Gilbert). July and August reports.

(July report) We have done no town survey work this month. The work completed includes:

Roberts County	1,111	sq. miles
Grant County	691	" "
Lake County	108	" "
Total	1,910	" "

The men traveled about 8,400 miles in canvassing this territory. The work done in Lake County is completing the territory unfinished last year. No barberries were found in this county in July.

Very heavy rains and muddy, often impassable, roads made work slow for the first 10 days. In some low areas the roads are still very poor. We expect to accomplish considerably more during the month of August.

(August report) During the month of August we scouted 16 townships in Deuel County and found but one barberry planting, 22 townships in Brookings County and found 4 rural plantings, and 8 townships in Moody County and found 3 rural plantings. We will complete the work in these three counties and should be able to finish Minnehaha County during the month of September.

WISCONSIN: College of Agriculture of the University of Wisconsin, Madison (Noel F. Thompson). No report.

WYOMING: College of Agriculture, University of Wyoming, Laramie (Ralph U. Cotter). Just returned from a trip over two of the counties of this State and found no barberry in one of them. The other, Laramie, in which the city of Cheyenne is located, seems to have more of these bushes than all the rest of the State combined. The attitude toward the eradication of these bushes is decidedly hostile. Many of the people feel that the city should get out the barberry bushes around its parks before the citizens should be required to get theirs out. At present, in view of the lack of State law, there is not much prospect of being able to get the bushes out in Cheyenne. I found one new location in Cheyenne and checked up on a number of others. In one of the city parks a number of the bushes have been cut down and are sprouting this year. It may be possible to get these out before they have a chance to get well established.

LEAF RUST INVESTIGATIONS.

(Dr. H. S. Jackson, Pathologist in Charge, and E. B. Mains, Associate.)

The taking of notes on winter-wheat varieties was completed the middle of July when the final set was obtained at Madison. The orange leaf rust of wheat has in general been less severe this season than during the season of 1918-1919. In the south, as indicated by specimens and reports from North Carolina, South Carolina, Georgia, Alabama, and Louisiana, this rust was slow in developing and did not become more than moderate in its severity by harvest. A similar condition was also found at Washington, D. C. Through Tennessee, Indiana, Illinois, and Wisconsin the rust developed only locally to moderate severity. At Jackson and Murfreesboro, Tenn., LaFayette, Ind., and Bloomington, Ill., there was little or no rust up to harvest time. At Knoxville, Tenn., Vincennes, Ind., and Madison, Wis., a moderate amount was in evidence. At both LaFayette and Bloomington, no rust showed on winter wheat until just before harvest and even the most susceptible variety was not over 25 percent rusted. At both of these places there was considerable winterkilling, especially among the soft winter wheats. At LaFayette, however, the spring wheat varieties later became rather heavily rusted. This would seem to indicate that in localities in this region the orange leaf rust was killed last winter and has since been replaced from surrounding localities where the conditions were more favorable for overwintering.

As a result of the studies upon the set of over 200 winter wheat varieties and selections grown at Knoxville, Tenn., LaFayette, Ind., Bloomington, Ill., and Madison, Wis., 45 varieties and selections have been noted which give promise as resistant wheats. Of these, about nine are very resistant. Among these varieties the Crimean wheats have shown the greatest resistance, although several soft winter wheats give considerable promise. Among the spring bread wheats several of the Bluestems and Fifes are showing considerable promise. Among the spring varieties of the wheat species this season, the clubs are extremely susceptible while the emmers, durums, spelts, and Polish wheats are with some varietal variation resistant. Einkorn is practically immune.

As a result of greenhouse and field observations it has become evident that at least two fairly distinct strains of the orange leaf rust are to be found in this country. From the data now at hand it appears that these are to be distinguished fairly easily by the character of infection produced upon differential wheat varieties. Further work is now being carried on in testing these varieties with various rust cultures and a search is being made for other varieties which may be used as differential hosts.

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Personnel (Sept. 1-10) and Field Station (Aug. 16-31) Issue.

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PERSONNEL ITEMS

Carleton R. Ball, cerealist in charge, left Washington September 4 on a two-weeks automobile trip to New England and New York.

Raymond F. Crawford, field assistant in the barberry eradication campaign in Iowa, resigned effective July 31 to accept a position at the Iowa Agricultural Experiment Station.

H. S. Garrison returned September 10 from a 10-day trip to southeastern Virginia and eastern North Carolina, during which he harvested part of his experimental corn plats at Terra Ceia, N. C. He reports that the corn crop now maturing is one of the best in recent years in the territory visited.

Miss Laura D. Cartwell returned to the office September 7 from a three-week vacation spent in the Shenandoah Valley and at Atlantic City.

LeRoy G. Gardner, field assistant in the barberry eradication campaign in Indiana, resigned August 31 to resume his studies at Purdue University.

Richard L. Harrison, who has been assisting J. C. Grinsmade, Jr., in the experiments with flax on the Northern Great Plains Field Station, Mandan, N. Dak., for the past two months, has resigned, effective August 31, to resume his college studies.

Dr. H. B. Humphrey returned to Washington September 7, after an extended trip through the West and South. Notes on his observations at Granite Falls, Minn., St. Paul, Minn., Fargo and Mandan, N. Dak., and Ames, Iowa, were included in an earlier issue of the Cereal Courier.

From Ames, Dr. Humphrey proceeded to Manhattan, Kans., where he conferred with Prof. J. H. Parker and others concerning the results of cooperative experiments in rust and smut investigations in progress there. Proceeding from Manhattan, stops were made at Denver, Ft. Collins, and

Greeley, Colo., at which points observations were made on the presence of stem rust on wheat and other cereals and on wild grasses.

From Greeley, Dr. Humphrey went direct to Pullman, Wash., and Moscow, Idaho, where he spent two days reviewing the results of a very profitable year's study of the bunt problem as now being conducted by Prof. E. F. Gaines, Cerealist of the Washington Experiment Station, and Mr. C. W. Hungerford, State Pathologist of Idaho. Brief stops were made at Yakima, Mt. Vernon, and Friday Harbor, Wash., at which points notes were taken on the occurrence of stripe rust and collections made of rusted grasses and cereals.

Dr. Humphrey next visited Corvallis, Ore., where he conferred with experiment station officials and had opportunity to inspect the experimental plats in the cereal disease nursery. He found that important progress had been made by Mr. Woolman in his smut investigations at Moro and Corvallis, and particularly in his cytologic study of bunt-resistant and susceptible wheat varieties.

The next stop of importance was at Biggs, Cal., where he was joined by Prof. W. W. Mackie in an inspection of the various rice experiments now being conducted at the Biggs Rice Station. Through the courtesy of Mr. E. J. Adams, formerly in charge of the Biggs Rice Station, Dr. Humphrey had opportunity to see a number of rice farms. The crop had not developed sufficiently to make it possible to take notes on the occurrence of any rice diseases. The next stop was at Davis, Cal., where during the past year the Office has conducted extensive and important investigations of cereal rusts and smuts. Dr. Humphrey next visited Berkeley, where he spent three days in conference with experiment station officials and with Prof. Mackie and Dr. Allen, who are engaged in the cooperative investigation of rusts and smuts. Through the courtesy of Mr. H. A. Borthwick, formerly of this Office, Prof. Mackie and Dr. Humphrey journeyed from San José to Salinas and Monterey. At Salinas such of Prof. Mackie's barley and wheat plats as had not been harvested were inspected. At Monterey they conferred with Prof. J. T. McMurphy, formerly employed by this Office in connection with the cereal smut control campaign in California, concerning recent progress in his further investigation of the disease known as barley scald, and the oat disease reported by him in 1915 caused by a species of Phytophthora.

Leaving California, Dr. Humphrey returned by way of Manhattan, Kans., where he had further conference with Professors Parker and Melchers, the latter having just returned from an extended vacation in California and Colorado. From Manhattan, he proceeded direct to Crowley, La., where he spent a day in conference with Dr. W. H. Tisdale, pathologist in charge of rice disease investigations. Dr. Tisdale has made marked progress in his experimental study of straighthead and certain seedling blights of rice and has discovered a new disease of this crop which attacks plants at or near the water line during the later stages of their development. The results of Dr. Tisdale's straighthead studies indicate that he has worked out an effective and practical method of control of this disease.

Dr. Humphrey's last stop was at Knoxville, Tenn., where he conferred with Mr. Kurtzweil of this Office and Prof. Essary of the Tennessee Agricultural Experiment Station relative to cooperative experiments at Knoxville and other points in Tennessee.

Dr. Annie May Hurd returned from her vacation September 7. During her absence she visited New York City and Boston, and spent two weeks visiting relatives in Nova Scotia.

Dr. A. G. Johnson left Washington for Madison, Wis., September 7. He stopped en route at LaFayette, Ind., and Bloomington, Ill., to confer with Professor Hoffer and Mr. Holbert concerning corn root and stalk rot investigation, and with Mr. Reddy at Bloomington, who is engaged in the study of flax diseases and certain phases of the corn root rot problem.

R. W. Leukel returned to Washington September 9 from a survey trip for the nematode disease of wheat in the eastern and southern wheat belt. He found that the disease has not invaded North Carolina, Tennessee, or Ohio. In Jackson County, Ga., the eradication campaign has met with some success.

H. B. Mackey returned to Washington September 7 from a two-week trip to Illinois, Arkansas, and Louisiana, during which he inspected hogging-down experiments with corn conducted in cooperation with the extension agronomist of the University of Illinois and took notes on corn-breeding experiments at Dunlette, Ark., and King, La.

James Sozans, field assistant in the barberry eradication campaign in Wisconsin, resigned September 6 to resume his former position as teacher in the High School at Bagley, Minn.

W. H. Tapke returned to Washington September 10, after a two months' stay in Granite City, Ill. Among other duties Mr. Tapke planned and directed the construction of a seed-treatment plant near Granite City where he superintended the treatment of 15,000 bushels of seed wheat for the control of bunt. The entire amount of seed is being treated by the copper sulphate-lime dip method, which has been shown by experiment to be effective in controlling this and certain other cereal smuts.

Miss Frances M. Dodd returned to Washington September 10 after an absence of 20 days, which time she spent at Berkeley Springs and other points in West Virginia and Virginia.

Dr. W. H. Weston returned to Washington September 7 after an absence of 26 days, during which time he visited relatives in Great Barrington and Boston, Mass.

VISITORS

Jacob J. Dunt, formerly scientific assistant in corn investigations, but now engaged in farming at Edgerville, Ill., was an Office visitor September 9.

J. H. Gillespie, formerly connected with this Office in cereal disease experiments, called September 8 on his way to New York City where he will take passage for Europe. Mr. Gillespie is expecting to visit relatives in the vicinity of Belfast, Ireland, for a time and later to visit Scotland

and England. He is hoping also to be able to visit the continent. He expects to return to his home in this country in about two months.

Junzaro Nawakuchi, Director in the Department of Agriculture and Commerce to the Karafuto Colonial Government, Japan, was an Office visitor September 11, at which time he arranged to obtain seed of a number of cereal varieties suitable for growing in Chosen (Korea), and to supply the Office with seeds of Korean cereals.

John D. Shanahan, formerly of the United States Grain Corporation and now engaged in the grain business in Buffalo, N. Y., was an Office visitor September 9. It will be remembered that Dr. H. V. Harlan was a member of Mr. Shanahan's party which made a survey of the food resources of central Europe in the summer of 1919.

Karl H. Townsend, who for a number of years was employed in the Office of Cereal Investigations, but who has been engaged in the pink bollworm campaign on the Mexican border since 1917, was an Office visitor during the week of September 6.

PUBLICATIONS

Galley proof of Farmers' Bulletin 1176, "The Control of the Root, Stalk, and Ear Rot Diseases of Corn," by J. R. Holbert and G. M. Hoffer, was read September 3, and page proof on September 9. It is expected that this bulletin will be ready for delivery September 13.

Page proof of Farmers' Bulletin 1168, "Varieties of Winter Wheat Adapted to the Eastern United States," by Dr. C. E. Leighty, was read September 2.

INCREASED RATES ON RAILROADS

The following memorandum to heads of offices was issued from the office of the Chief of the Bureau under date of September 1, 1920:

Effective August 26, 1920, the cost of all inter-state railroad tickets advanced 20 per cent, and there will be a surcharge on transportation in sleeping and parlor cars of 50 per cent of the sleeping or parlor car fare.

Indicating the procedure to be followed by Government employees in negotiating Transportation Requests under the increased tariffs, the representative of the several Passenger Associations has advised this Department as follows:

> "Surcharges will be collected (if cash is used) by Agent at time charge for occupancy of space is collected, and Government Transportation Requests drawn for sleeping or parlor car space will be presumed to cover surcharge. - - - - -

"The surcharge applies on the space occupied (engaged) regardless of the number of occupants."

This necessitates no change in the procedure now followed by officers and employees of this Bureau. As at present, two transportation requests should be prepared and presented - one in exchange for railroad ticket; a second to secure parlor or sleeping car accommodations to destination to the cost of which the surcharge of 50 per cent will be added.

The ticket agent will indicate on the request, in the space provided for showing the form and number of passage ticket, the specific space to be furnished, that is, berth or seat number, car number, train time, and unless already shown by the request, the name of the initial road. Proper notation will then be made by the ticket agent on his office diagram, and the request returned to the holder for surrender to the first Pullman conductor.

If, after a reservation has been made, the trip is abandoned, the ticket agent should be notified immediately so that the space can be released. It will be permissible, if the request is returned to the ticket agent before departure of the train, for him to erase the reservation from his diagram and the request, and enter a new reservation thereon.

All transportation requests will be lifted by the initial sleeping or parlor car conductor, who will provide transfer checks where necessary.

The transportation request for Pullman accommodation is not to be surrendered to the ticket agent, but to the Pullman conductor.

When through travel is involved, the transportation requests should be made out for through accommodations, without regard to the number of roads involved or definite reservation beyond the first transfer point. The rules of the Pullman lines are clear in providing for the acceptance of through transportation requests and the issuance, by the first Pullman conductor, of a transfer check to the connecting line.

FIELD STATION COLLECTION AND PROGRESS

SOUTH EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (T. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Hurtzweil). Stem rust and leaf rust were found on volunteer wheat near Greeneville in Greene County August 21. Stem rust was found on timothy and redtop and leaf rust on volunteer oats at Crossville in Cumberland County August 25. Leaf rust on volunteer oats is very plentiful at Knoxville. Diplodia as well as Fusarium root rot is causing some damage on corn.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). No report.

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love). The weather during part of August has been rather unfavorable to the harvesting of oats in the central part of the State. Considerable loss has been suffered owing to too frequent rains. In the northern part of the State, however, weather conditions were better and the oats were taken care of in most cases in very good shape. The oat crop in the northern part of the State is very good.

Here at the Station most of the grain was well taken care of with the exception of some barley which could not be stored in the drying shed on account of lack of room.

The harvesting of small grains and the threshing of wheat was all completed during the month. The ground is being prepared for the fall seeding of wheat and rye.

During the month harvesting and inspection trips have been made in different parts of the State to look after our various rye, barley, wheat, and oat experiments. In the northern part of the State some very interesting demonstration meetings were held in connection with our oat breeding work. Farmers are becoming very much interested in this phase of the work and the results are very gratifying. Particular interest is being taken in some new strains which have been developed. These show very promising results and no doubt will be taken over by the farmers for rapid multiplication.

The material which was grown at Chico, Cal., the past year has been received and part of it will be seeded at Ithaca while another part will be returned to Chico for seeding this fall.

INDIANA

Indiana Agricultural Experiment Station, Lafayette (H. S. Jackson and E. B. Mains). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). During the latter half of August corn in Missouri was greatly benefited by several rains. In some localities the rainfall was excessive. At present the condition of corn in the western half of the State is excellent and in the eastern half of the State is about average. Fall plowing is well advanced but has been delayed in some sections where heavy rains have fallen.

In the rod-row varietal experiment with wheat, the leading varieties were as follows:

Konred,	24.2 bushels
Red Rock,	19.2
Farmers Friend,	18.9
New York 123-32,	18.6
Kessinger,	18.4
Jones Climax,	18.2
Kharkov,	17.9
Fultz (average of all checks),	17.6

Each variety was grown in four distributed blocks of five rod rows each, and the yields were computed from the three interior rows of each block. Ninety-four varieties were included in the experiment.

GREAT PLAINS AREA (South to North)

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). During the last half of August there was one period of rainy weather, since which the weather has been rather cool. This has enabled the sorghums to make good growth without suffering for moisture. The sorghums and broomcorn have been ripening rapidly.

With the exception of the Sumac sorgo all of the varieties of the first three dates-of-seeding have been harvested, as has the feterita and Barchet kaoliang seeded June 1. The rate-of-seeding and method-of-spacing experiments with Sunrise kafir will be harvested within the next few days, with yields probably above the average.

Eleven plats in the broomcorn varietal experiment were harvested on August 27. The plats in the rate-of-seeding experiment with broomcorn are ready to harvest at present and will be pulled as soon as the weather is suitable.

The earlier varieties in the varietal experiments with grain sorghums are ready to select seed heads from and to harvest.

The precipitation for the last half of August was 1.44 inches, making a total of 2.64 inches during the month. The rainfall was well distributed and with cool weather the sorghums have been growing nicely.

KANSAS

State Experiment Station, Manhattan (John H. Parker). No report.

Fort Hays Branch Station, Hays (A. H. Swenson). During the month of August approximately 6 inches of rain fell in this vicinity, with resulting great benefit to crops. The weather has been cool and pleasant. Threshing which was delayed earlier in the month has been resumed again. Much fall plowing has been done as a precaution against the Hessian flies.

In few instances, the Hessian flies have already emerged and deposited their eggs. These eggs have hatched into the young larvae which are now working in the volunteer wheat. Disking is being done on the Station farm and on the cereal project to destroy the volunteer wheat.

Early White milo, Freed sorgo, Kaoliangs, and early strains of feterita are ripe. Harvest will begin within the next two days. All of the guard rows between the plats will be cut so that each individual plat will stand out by itself to facilitate easy harvesting. Each plat will contain 4 rows, equivalent to one twenty-fifth acre. Most of this week has been spent in taking notes of the individual plants in the Red Amber x Feterita cross. In all, the plants of 110 rows have been studied.

September 11 the Station will hold its fifth annual "Sorghum Day." The members of the Boys' and Girls' Sorghum Club of Ellis County have been invited to be present. The program will be in two parts, one for the members of the Sorghum Club and the other for the farmers and others who are interested in better sorghums. The program will be in the field.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). The weather during the month of August was comparatively favorable for harvesting and threshing operations in northeastern Colorado. Harvest started about two weeks later than usual in this section of the State and as a result much of the grain was not harvested before the middle of August. A few fields were never harvested, as rains during the latter part of the month caused the grain to lodge badly.

Due to the shortage of cars in which to ship the wheat and the comparatively low price being paid by the local buyers, a rather small percentage of the crop is being threshed. In the immediate vicinity of the Akron Field Station, apparently not over 40 to 50 per cent of the crop has been threshed.

Seeding of fall wheat started the latter part of August. Thousands of acres of wheat have already been sown. Experience has taught the farmers that the early seeding of winter wheat is the most profitable in this section. It is generally believed that early seeding of wheat reduces the danger of blowing out, furnishes more pasture for livestock, reduces the percentage of bunt, and enables the wheat to ripen earlier in the season, thereby reducing the loss from dry weather and hail.

Much interest is being shown in this section in Kanred wheat. It is very likely that several thousand acres of this variety will be sown in northeastern Colorado this fall. Most of this wheat will be sown with seed obtained either from the Akron Field Station or from farmers to whom this Station sold Kanred seed last fall. Possibly more farmers have visited the Station during the past month to get information with regard to Kanred than visited it to get information on all other subjects during the two years previous to 1920.

The corn crop in northeastern Colorado is much above normal. Since the spring was rather late there is some danger that early frosts may prevent the crop from ripening properly, but if frosts hold off until the end of September it is very likely one of the largest corn crops ever grown here will be harvested.

The crops of sorgo, millet, beans, and potatoes are all much above the average. Sorgo, millet, and beans are ripening under comparatively favorable conditions.

Work on the Akron Field Station is slightly behind the season, due to the many unfavorable conditions with which we have had to contend. It is

possible, however, that the Station work is further advanced than is the fall work on most of the farms adjacent to the Station.

Threshing of the Office winter wheat, oats, and barley plots has been completed. Only a few of the spring wheat plots have as yet been threshed. Local showers have delayed our threshing to a considerable degree.

The yields made by those plots of winter wheat which did not blow out were very good. The highest yielding plot of winter wheat produced 52.5 bushels to the acre. This was a plot of the 5-peck September 4 seeding of Kanred, C. I. No. 5146, on fallow. Many of the earlier sown plots of Kanred in the rate-and-date experiment yielded better than 35 bushels to the acre, while more than ten plots yielded 40 bushels or more. There was a very wide difference between the yields made by the early and late seedings in the experiment. The three early seedings yielded nearly twice as much as the later seedings. The two seedings made in October were greatly damaged by soil blowing, which probably accounts for a large part of the difference in the yields.

The yields made by the plots of spring oats and barley were the highest recorded since 1915. The earlier varieties of these crops did not yield as heavily as did the later maturing varieties. This apparently was due to a slight drought which occurred during May. Possibly the earlier maturing varieties were far enough advanced to be injured by this dry spell while the later maturing varieties escaped uninjured.

The highest yielding plot of oats on the Office projects was a plot of Kherson, C. I. No. 459, which yielded a little over 65 bushels to the acre. This plot was used as a check plot in the oat selections grown on soil cropped to potatoes in 1919. A selection from Kherson made at Akron in 1918 yielded between 63 and 64 bushels to the acre on the same soil treatment. The stand of plants in this plot was nearly 20 per cent below that of the Kherson plot which gave the highest yield this season.

The highest yielding plot of barley grown at Akron this season was a fiftieth-acre plot of Hannchen, C. I. No. 531, Akron selection 2-09. This plot produced 45.1 bushels to the acre. The second highest yielding plot of barley grown this year was one of White Smyrna, C. I. No. 658, Akron selection 1-2, with a yield of 44.4 bushels to the acre. Both of these plots were grown on soil cropped to potatoes in 1919.

Only about half of the spring wheat plots have as yet been threshed. Of those varieties which have been threshed, Kota, C. I. No. 6248, has given the highest yield, about 19 bushels to the acre.

The first seeding in the rate-and-date experiment with Kanred wheat, C. I. No. 5146, was made August 17. This wheat has emerged rather slowly, as it was sown in a dry seed bed. From present appearances, however, the stands in the different plots will be very satisfactory. The second seedings in this experiment were made September 1.

Following are the average acre yields in bushels of winter wheat varieties on two fiftieth-acre plots on fallow and two on corn land, and also the average yields from the four plots of each variety:

Variety	C.I.No.	Fallow	Corn land	Average
Konred	5146	27.9	32.3	30.1
Turkey	1371	24.5	18.9	21.7
Crimean	1456	19.6	18.8	19.2
Minturki	6155	20.4	15.8	18.1
Kharkov	4207	23.1	12.7	17.9
Kharkov	5549	22.3	13.3	17.8[a]
Arnautka	1555-2-2	19.3	14.3	17.2
Kharkov	1565	19.1	13.2	16.2
Kharkov	1442	18.8	12.5	15.7
Buffum	5330	19.2	12.0	15.6
Ghirka Winter	1458	17.1	11.7	14.4
Alberta Red	5797	16.1	10.7	13.4
Blackhull (Clark)	6251	12.4	11.5	12.4
Red Winter	6215	11.5	9.9	10.7
Nebr. Hybrid No. 28	5147	7.2	10.0	8.6

[a]Only one plot of Kharkov, C. I. No. 5549, was grown on fallow and one on corn land.

All varieties in the experiment were sown September 16, excepting Kharkov, C. I. No. 5549, and Blackhull, C. I. No. 6251. The plots of these two varieties were sown October 2. All plots in the experiment were sown at the rate of three pecks to the acre. The plots in the 3-peck September 16 seeding in the rate-and-date experiment were also used as the varietal seeding of the Konred, C. I. No. 5146.

In the combination rate-and-date-of-seeding experiment with Konred winter wheat, C. I. No. 5146, the following yields were obtained, the plots on fallow and on corn land being fiftieth acres duplicated:

Date	Rate pecks	Fallow	Corn land	Average
August 16	1	16.4	7.1	11.7
"	2	27.9	9.6	18.7
"	3	36.1	17.9	27.0
"	4	39.2	19.4	29.3
"	5	39.3	23.2	31.2
Sept. 4	1	39.5	24.0	31.8
"	2	43.9	30.4	37.1
"	3	40.3	38.5	39.4
"	4	41.8	40.0	40.9
"	5	43.9	42.2	43.4
Sept. 16	1	26.3	28.3	27.3
"	2	28.9	32.9	30.9
"	3	27.9	32.3	30.1
"	4	28.5	29.7	29.1
"	5	23.4	25.8	24.6

Oct. 1	1	5.9	1.5	3.7
"	2	4.5	2.6	3.5
"	3	6.6	5.6	6.1
"	4	6.5	4.6	6.1
"	5	6.1	4.6	5.3
Oct. 17	1	5.5	4.3	4.8
"	2	6.8	7.1	6.9
"	3	7.8	9.7	8.8
"	4	12.5	9.8	11.1
"	5	12.8	12.5	12.6

The seedings of October 1 were treated too heavily with the formaldehyde treatment. Both of the two later groups of plots were severely injured by blowing.

WYOMING

Cheyenne Experiment Farm, Archer (A. L. Nelson). Weather conditions during August, on the whole, have been favorable for crop production. The rainfall, 0.77 inch, consisted of small showers which, while not wetting the soil to any depth, were of considerable benefit to crops. If frosts are delayed about three weeks most crops will have matured with good yields.

Winter wheat to the east of Archer is very good and there is a large demand for seed of the Kanred variety. Its yield was high, large fields yielding 20 bushels to the acre. The rust conditions of last year and again this year are causing the farmer to inquire for wheats which are rust resistant. Much interest is being taken in this matter. The station is preparing exhibits for various fairs showing the rust resistance of various wheats.

The work at the station is progressing well. The winter wheat and early oats are harvested and the early varieties of spring wheat are ripe. Most of the barleys are ripe and the peas are making splendid growth. The proso millets have experienced a hard season. Those most hardy to cold and drought are Yellow Manitoba, C. I. No. 101, introduced at this station this year, and Black Veronezh, C. I. No. 161, both of which made very good growth this season. The foxtail millets look fine. Golden Wing, S.P.I. No. 22491, is 72 inches tall. The Hursk millets are about 50 inches in height.

The corn crop has grown considerably but will only reach the early silage stage. The Giant Russian sunflowers have made a wonderful growth and inquiries are often made concerning them. The large ranchers especially are interested and some have expressed themselves as intending to seed a large acreage next year.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzell). No report.

Northern Great Plains Field Station, Mandan (J. S. Brinsmade, Jr.). The latter part of August was generally hot and windy. For the three days, August 16, 17, and 18, the velocity of the hot, dry winds averaged 10.5 miles per hour. For the five days from August 26 to 30 the wind velocity averaged 8.7 miles per hour. On August 27 and 28 the drought was broken by a rain amounting to 1.18 inch. Since then the weather has been generally cloudy and showery.

All of the flax nursery on clean land and most of the rows on diseased land have been harvested.

The winter hardiness nursery of winter wheat was sown August 30, immediately after the rain.

Threshing of the spring wheat biologic form nursery was completed today. The lay of the land favored the varieties near the beginning of the series so that comparative yields are of little value. The two heaviest yields from single rows were at the rate of 37 bushels per acre for one row of Kubanka, C. I. No. 4063, and 36.5 bushels per acre for one row of Monad. The smallest yields were at the rate of 12.5 bushels for one row of Khapli emmer and 14.5 bushels for one row of Prelude.

Threshing of all wheat, oats, and barley in the D.L.... rotations was completed last week. Threshing of the varietal plats, postponed on account of rain, will commence tomorrow.

Maximum temperature for the last half of August was 100°, recorded August 16; minimum, 39°, recorded August 21; precipitation 1.22 inches.

Mr. L. H. Dewey was here August 21 inspecting and photographing the fiber flax plantings. Mr. C. W. Warburton was here August 25. Mr. Richard L. Harrison, who has been assisting with the cereal work for the past two months, resigned effective September 1 to resume his engineering studies at Purdue University.

Dickinson Substation, Dickinson (Ralph W. Smith). On August 27 and 28 a rain of 1.24 inches fell, which is the second rain of importance since the middle of July. During most of that period hot, dry weather has prevailed, causing rapid ripening of cereal crops. The total precipitation since April 1 is 11.70 inches, which is an inch above normal. During June and early July the rainfall was well distributed and sufficient for the immediate needs of crops, which were handicapped by the extremely dry condition of the subsoil. During the still, hot weather of July stem rust developed in wheat and barley and was a factor in reducing slightly the yields of susceptible varieties.

The threshing of all varietal plats was finished last week and the yields of wheat are given below. The highest yielding varieties in the principal groups are as follows:

Durum - - -	Monad - - - - - - - -	26.7 bushels per acre
Fife - - -	Power - - - - - - - -	19.1
Preston - -	Kota - - - - - - - -	22.4
Bluestem -	Haynes - - - - - -	14.6

Of the 143 head selections of Kubanka made in 1915, 30 of the more promising were grown in small plats of about one one-hundredth acre each. Some of these proved as rust resistant as Monad and yielded more, but as they were in narrower plats the yields are not comparable.

Most of the durum varieties tested above 60 pounds per bushel while the Fife and other common varieties, being affected by rust, tested somewhat less. Red Bobs was badly rusted and tested about 54 pounds per bushel.

The yields of oats and barley varieties were good and will be given in a later report. Seed of winter rye and winter wheat is being prepared for fall seeding.

Mr. Warburton visited the Substation August 2-.

Following are the yields in bushels per acre of spring wheats grown in triplicated fiftieth-acre plots:

C.I.No.	Group and Variety	Bushels
	DURUM	
3320	Monad	26.7
1440-98	Kubanka (Dickinson Selection No. 98)	24.8
3522	D-5	24.2
5254	Acme	23.8
1440	Kubanka (Home grown seed)	23.6
1440	Kubanka (Seed from Langdon, N. D.)	23.5
4063	Kubanka No. 8	23.2
1584	Pelissa	21.5
4064	Arnautka	21.2
5296	Mindum	21.1
1440-58	Kubanka (Dickinson Selection No. 58)	21.1
	Khapli	20.5
6227	Golden Ball	20.4
	Average of durum varieties	22.7
	FIFE	
3697	Power Fife	19.1
3022	Rysting	18.0
3529	Red Fife	17.1
2873	Glyndon	16.2
3641	Marquis	15.9
6047	Ruby	14.8
	Red Bobs	14.0
	Average of fife varieties	16.4
	PRESTON	
3878	Hota	22.4
4788	Kubanka x Haynes	20.8
3031	Preston	18.5
4789	Kubanka x Preston	17.0
4324	Pioneer	16.3
	Average of preston group	19.0
	MISCELLANEOUS	
4323	Prelude	17.8
	LUBOGI	
3315	Huron	16.3
	BLUESTEM	
3274	Haynes	14.6
3314	Crossbred	13.4
	Average of bluestem varieties	14.0

*Only one plot grown.

MONTANA

Judith Basin Substation, Moccasin (Ralph T. Hay). (Sept. 2) The cool damp weather of the past week or ten days has delayed harvesting of the spring grains and threshing of the winter wheat. However, we have not taken advantage of the time in sowing as much of the winter wheat as we have reserve seed. All of the furrow-drill experiments including the straw mulching, method-rate-direction of seeding, and cultivation experiments, were sown yesterday (Sept. 1. The varietal experiments and the nursery will necessarily have to be delayed until after threshing in order to obtain seed.

Spring wheat and oats have been ripening very slowly the last two weeks due to the cool weather. Prelude is the only variety of spring wheat that has been harvested but Pionter, Ruby, and Red Bobs wheat and Victory oats are now ready. These are the last of the new varieties to be harvested. Prelude wheat shatters very badly, which is perhaps the reason why the average yields have been so low here.

The precipitation for August was 1.85 inches, 1.32 inch fell from the 25th to the 30th, inclusive, precipitation having been recorded every day during that time.

NORTH PLAINS AND COAST AREAS
(South to North and West)

UTAH

Nephi Substation, Nephi (Lauren H. Brocken). Two disastrous hail storms, the first in the memory of old residents, visited Juab Valley on August 27. Windows were broken, chickens were killed, and people who were out in the storms declare one such experience is sufficient. Some of the hailstones measured 4.5 inches in circumference. The first storm, which came during the morning, did no damage to crops on the station but the second, in the afternoon, stripped almost every leaf from the corn, potatoes, beans, and sunflowers, and threshed considerable grain out of the shocks.

Threshing on the station has been greatly delayed by recent storms, but can be completed with one week of clear, warm days. The only encouraging feature of this delay is that the fallow will be in excellent condition for early fall seeding.

The farmers of this section are showing a decided interest in securing pure seed for fall sowing. All Hadley and Nafel wheat grown on the station has been sold to men in Juab Valley.

The precipitation for August amounted to 2.14 inches, most of which fell from the 15th to the 31st of the month. The maximum temperature of 96° occurred on the 7th and 16th, and the minimum temperature of 38° on August 28.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Oregon Agricultural Experiment Station, Corvallis (C. V. Owens). No report.

Sherman County Branch Station, Moro (D. E. Stephens). Favorable weather for harvesting operations prevailed during most of the month of August. Showers on August 27 and 28, with rainfall of 0.61 inch, delayed harvesting operations on some farms. Since these showers, the weather has been dry and warm, so that harvesting throughout the county is now about completed.

Threshing began on the Station on August 4 and was completed August 24. During this time we threshed about 35 acres of increase fields of wheat and barley; 250 plots of rotation, tillage, and rate and date experiments; 90 varieties of grains, most of them in duplicate or triplicate twentieth-acre plats; and about 1,500 rod rows of varieties, selections, and hybrids in the nursery.

Following are the results obtained from the regular winter wheat varietal experiment:

C.I.No.	Variety	Yield, bushels per acre			
		Ser. 1	Ser. 2	Ser. 3	Avg.
4511	Wash. Hybrid No. 126	36.3	37.7	36.3	36.4
5408	Triplet	38.7	34.7	33.7	35.7
6251	Clark Bluchull	33.0	37.7	-	35.3
1556	Turkey	33.3	34.6	32.3	33.4
1442-12	Kharkov	33.0	33.2	34.3	33.2
4429	Local Turkey	33.3	35.3	32.0	33.2
6250	Nebraska No. 60	33.0	33.0	-	33.0
2998	Turkey	32.7	32.3	34.0	33.0
5146	Kanred	33.7	29.0	35.3	32.7
5544	Superwheat	31.7	34.0	32.3	32.7
1571	Turkey	32.0	34.3	31.3	32.3
1569	Argentine	31.3	33.7	31.7	32.2
2979	Alberta Red	31.7	33.7	31.3	32.2
4511	Wash. Hybrid No. 123	33.3	32.7	30.0	32.0
	Fortyfold X Little Club	33.3	33.0	29.7	32.0
5549	Kharkov (Mont. No. 36)	30.0	33.0	32.3	31.8
4468	Jones Winter Fife	32.3	31.0	31.7	31.7
4156	Fortyfold	27.0	26.7	23.7	25.8

Following are the average yields obtained from the varieties in the spring wheat varietal experiment:

C.I.No.	Variety	Yield, bu. per acre
4733	Hard Federation	27.8
4734	Federation	24.5
2826-1	Dobs	24.0
1697-172	Early Baart	24.0
4981	White Federation	23.6
4980	Hard Federation	23.2
1697	Early Baart	22.1
5036-2	Sonora	20.5
4063	Little Club	20.0
5208	Huston	19.6
4158	Marquis	19.2

4067	Pacific Bluestem	18.2
5407	Red Allen	16.8
	Red Chaff Club	15.3
6255	Red Bobs	15.0

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). No report.

Plant Introduction Station, Chico (V. H. Florell). No report.

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BUREAU OF PLANT INDUSTRY

C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture.
(NOT FOR PUBLICATION)

Vol. 12 September 20, 1920 No. 22
Personnel (Sept. 11-20) and Field Station (Sept. 1-15) Issue.

PERSONNEL ITEMS

F. M. Baldwin, field assistant in the barberry eradication campaign in Iowa, resigned September 11, to resume his duties as assistant professor of entomology of Iowa State College.

Dr. Carleton R. Ball, cerealist in charge, returned to the Office September 20 from a two weeks vacation trip to New England.

Walter L. Blain, field assistant in the barberry eradication campaign in Illinois, resigned September 7 to continue graduate study at the University of Illinois.

Reuben O. Carlson, Field assistant in the barberry eradication campaign in South Dakota, resigned September 13 to resume his studies at the University of Illinois.

Robert S. Carruthers, who has been under appointment as messenger during the summer months in the Washington office, resigned September 13 to resume his studies in the Washington schools.

Robert F. Craig, field assistant in the barberry eradication campaign in Nebraska, resigned September 14 to resume his college studies.

C. P. Hartley returned to Washington September 20 from a week's inspection of corn experiments in New York and New England.

Sylvester L. Humphrey, field assistant in the barberry eradication campaign in Ohio, resigned September 13 to resume his studies at the Ohio State University.

Stanley F. Husted, field assistant in the barberry eradication campaign in South Dakota, resigned September 13, to resume his studies at Syracuse University.

R. W. Leukel left Washington September 19 for Madison, Wis., where he will conduct physiological researches in connection with the study of the nematode disease of wheat under the direction of Dr. A. G. Johnson.

Hazen Petrie, field assistant in the barberry eradication campaign in Wisconsin, resigned September 11, to continue his studies in the University of Wisconsin.

Miss Jessie P. Rose, scientific assistant in stripe-rust investigations at Corvallis, Oreg., has been granted three months leave without pay, effective September 16, she having been called to Ashland, Oreg., on account of the serious illness of her mother.

Howard W. Sechrist, field assistant in the barberry eradication campaign in Iowa, resigned September 11, to resume his college studies.

Mrs. Bonny Webber Starkey, clerk in the Washington Office for the past year, transferred to the Bureau of Soils September 16.

William N. Steil, field assistant in the barberry eradication campaign in Wisconsin, completed his temporary appointment on September 18, and is returning to his former position in the Department of Botany, University of Wisconsin.

Miss Vera M. Vincent, stenographer and typist in cooperative cereal investigations at Manhattan, Kans., resigned September 4 to accept a position at Garden City, Kans.

VISITORS.

R. J. Garber, formerly instructor in agronomy at the Minnesota College of Agri ulture and recently elected assistant in farm crops at the University of West Virginia, was an Office visitor September 16.

PUBLICATIONS.

Galley proof of a paper entitled "Relative Yields in Broken and Entire Kernels of Seed Corn" by Ernest B. Brown, which will appear in the September-October number of the Journal of the American Society of Agronomy, was read September 14.

Department Bulletin 883, "Experiments With Flax on Breaking," by Charles H. Clark, was received from the printer September 20.

The edition of 6,000 copies of Department Bulletin 877, "Australian Wheat Varieties in the Pacific Coast Area," by J. Allen Clark, D. E. Stephens, and V. H. Florell, was received September 21. This bulletin bears the date of September 16.

Reprints have been received of a paper entitled "The Development of Kernels in Normal and Clipped Spikes and the Limitations of Awnless and Hooded Varieties," by Dr. H. V. Harlan and Stephen B. Anthony. This paper was printed in the August 2 issue of the Journal of Agricultural Research, vol. 19, no. 9, pp. 431-472.

Farmers' Bulletin 1175, "Better Seed Corn," by C. P. Hartley, was received from the printer September 20.

Galley proof of a paper entitled "Injury to Seed Wheat Resulting from Drying After Disinfection with Formaldehyde," by Dr. Annie May Hurd, which will appear in an early issue of the Journal of Agricultural Research, was read September 20.

Galley proof of a paper entitled "The Inequality of Reciprocal Corn Crosses," by Fred D. Richey, which will appear in the September-October number of the Journal of the American Society of Agronomy, was read September 4.

FIELD STATION CONDITION AND PROGRESS.

HUMID EASTERN STATES (South to North).

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No. report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). No report.

TENNESSEE

State Experiment Station, Knoxville and Substations (C. Kurtzweil). No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). Preparations for fall seeding of cereals in nursery and plats are now in progress. Considerable damage to seed grains has resulted from a heavy infestation of grain weevil (Calandra granaria), and several days were spent in combating this pest. An attempt was made to rid the premises of the weevil by the use of heat but the proper temperature control could not be obtained with the apparatus on hand. By heavy fumigation with cyanide further damage to the grain has been stopped.

The 1920 plat yields of wheat were as follows:

Variety.	C. I. No.	Bu. per acre.	
Purple Straw	1957	34.1	
Leap	4823	33.9	
Poole	3489	31.9	
Mo. Bluestem	1912-2	31.7	
Poole	1979	31.1	
Mammoth Red	2008	31.1	
Red Rock	5976	31.0	
Lancaster	1945	30.9	
Purple Straw	1915	30.7	Av. 35 check plats
Dietz	1981	30.2	
Poole Type	1733	30.1	
Early Genessee Giant	1744	29.9	
Tennessee Fultz	6163	29.4	
Bearded Purple Straw	1911	28.7	
Jones Winter Fife	1933	28.6	
Hybrid	3608	28.4	
Fultz	3598	28.3	
Rod Row No. 676		28.3	Single plat
Stoner	2980	28.2	
Fulcaster	6162	28.2	
New Amber Longberry	1973	28.1	
Bearded Purple Straw	1911-1	28.1	
Row Row No. 62		27.6	Single plat
Mo. Bluestem	1912	27.4	
Hybrid	3614	27.3	
Currell	3326	27.1	
Fultz	1923	27.0	
Rocky Mountain	1930	26.1	
China	180	26.1	
Illini Chief	5406	25.4	
Rod Row No. 294		25.3	Single plat
Dawson's Golden Chaff-	6161	24.9	
Nebraska Hybrid	5147	22.8	Av. 4 plats
Acme	3115-2	22.7	
Rod Row No. 959		16.6	Single plat
Manred	5146	15.4	Av. 4 plats
Power Life	3697	14.9	
Haynes Bluestem	2874	14.6	
Preston	5641	14.4	

Plats in triplicate unless otherwise noted.

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love). No report.

INDIANA

Indiana Agricultural Experiment Station, Lafayette (H. S. Jackson and E. B. Mains). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler) The first half of September in Missouri was mostly cloudy and cool, though the last three days have been fair and warm. The corn crop is in good to excellent condition but will need dry, warm weather from now on to mature it before frost. The crop over the State is said to be about two weeks late. Wheat seeding has begun, with considerable increase in acreage promised.

The leading varieties of oats in rod rows during the past season were the following:

Variety.	Yield per acre, bu.
Burt	43.48
Nebraska No. 21	43.16
Early Champion	39.91
Sixty-Day	39.85
Kherson selection	39.79
Fulghum	36.98

GREAT PLAINS AREA (South to North)

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). The first ten days of September were wet and cloudy, preventing field work.

Harvesting both broomcorn and sorghums has been in progress since the weather cleared. The spacing experiments with Sunrise kafir were harvested on September 2, while those experiments with Dwarf milo were harvested September 14. This year's results from these experiments should be very interesting. Six plats of broomcorn in the rate-of-seeding experiments were harvested on September 2. The date-of-seeding plats are being harvested as they become mature. A number of plats of sorghums of the varietal experiment were harvested today.

The Woodward County Fair is to be held on September 21, 22, and 23. The Woodward Field Station will make a small display of the different varieties of sorghums, sorgos, and broomcorn.

The precipitation for the first half of September was 5.13 inches.

KANSAS

State Experiment Station, Manhattan (John H. Parker). (August). Soaking rains fell in eastern counties during the first week in August. In the second week there was plenty of rain in nearly all parts of the State, totaling from 1 to 3 inches in many localities. During the third week there was considerable rainy weather and no temperature as high as 100°. Corn made good to excellent growth except in the territory extending eastward from Garden City and Liberal to Salina and Wichita. Soaking rains fell during the fourth week, totaling as much as 7 to 8 inches in a few localities and 1 to 3 inches in many sections of the State. There were no temperatures as high as 100°. Corn made excellent growth and in some counties the ears were denting. Most of the 150,000,000 bushel corn crop will be safe from frost by September 25, except that in the extreme northwestern counties, where all of September will be required to mature the corn. Grain sorghums were reported as food to excellent.

The weather for the most of August at Manhattan was unusually cool and wet. The maximum temperature was 96° or the 9th; minimum, 46° on the 14th. There was measurable precipitation on 9 days during the month which totaled 6.14 inches.

September. Cool, wet weather prevailed in most parts of the State the first week, with afternoon temperatures usually below 90° and often below 80°. Grain sorghums and corn were reported as making good growth but were in need of warm, sunny weather for normal maturity. The second week was cool and cloudy and rains totaled from 1 to 2 inches in most counties. Silos were being filled and sowing wheat began in the northwestern counties. There were showers in many parts of the State during the third week and high temperatures and more sunshiny weather favorable for maturing corn and sorghums. Sowing wheat was under way in nearly all the western half of the State and was about 25 percent completed in the extreme northwestern counties.

Mr. Parker left Manhattan on September 8 and visited points in Greenwood and Woodson counties with Mr. B. E. Rothgeb. The sorghum hybrids being grown by Mr. I. N. Farr near Toronto, Kans., were inspected and two large fields of a so-called new variety of grain sorghum known as "Ninety-day Sugar kafir" were visited near Virgil, Kans. This variety proved to be Dwarf Hegari. One of the fields had been mature for almost a week and because of the rainy weather the grain had molded and in many heads had sprouted, making it totally unfit for seed and of low market value. The other field was in excellent condition and with normal weather would make a fine grain crop. September 10 was spent in McPherson and Saline counties in making field inspections of standard Blackkafir for the Kansas Crop Improvement Association. This is the first year that grain sorghum has been inspected in the field and a pure seed list published, giving the results of these field inspections. It is expected to extend this work to other crops in the future. September 11 and 12 were spent at the Fort Hays Experiment Station. September 11 was given over to the activities of Sorghum Day and the 12th to a careful inspection of the work in the grain sorghum project.

Mr. Parker returned to Manhattan on September 13 for the opening of College. We have about 110 students in grain crops which are divided into four sections for their laboratory work. This in addition to genetics seminar will constitute his teaching for the fall semester.

Fort Hays Branch Station, Hays (A. F. Swanson). The weather from September 1 to 15 has been favorable for crop development. At present the indications are for drier weather.

The seeding of wheat is now quite general in this community. A hundred miles west seeding was begun September 1 and much of the wheat is already up. The first rate-and-date-of-seeding plats of winter wheat on the Cereal Project were sown September 8. Seeding will be continued weekly until October 1. The varietal experiment will not be sown until October 1 in order to avoid Hessian fly injury.

Saturday, September 11, was "Sorghum Day." An enthusiastic crowd was present. One of the features was a picnic by the local Boys and Girls Sorghum Club, after which they inspected the sorghums with the farmers and other visitors present. Among the outside visitors was Prof. J. H. Parker and Karl Quisenberry from Manhattan and B. E. Rothgeb and his assistant, Mr. Matters, from the Bureau of Markets.

With the assistance of Mr. Quisenberry the taking of notes of the Red Amber feterita cross will be completed September 17. The harvesting of the sorghum varieties will start next week as soon as a few more selections can be made.

Embert Coles, who assisted on the Cereal Project during the summer, left September 7 to resume his school work at Manhattan.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). Weather conditions at Akron Field Station during the first 10 days of the month were very unfavorable for field operations. Several heavy rains fell during this period and temperatures were unusually low for this early in the season. A severe hail storm visited this locality the evening of September 2. The hail stones were very large, many of them being nearly as large as hen eggs. Many of the window lights on the Akron Field Station were broken, apples were knocked off the trees, and gardens were almost totally ruined. In the plats the ears of corn were badly damaged and the heads of sorgo were damaged considerably. Many of the heads of sorgo were broken off. Not all of the small grain had as yet been thrashed and considerable loss resulted through shattering. About 8 o'clock the morning of September 3 a second hail storm occurred. Much more hail fell than during the storm of the previous evening, but the stones were smaller in size. This storm was accompanied by nearly an inch of rain. The damage done by this second storm was nearly as great as that by the first. The leaves of corn and sorghum were almost all stripped off and the stalks were beaten so severely that many of them have gone down. It is likely that the yields of the plats of sorghum were reduced from 20 to 25 percent by these two storms. The loss to the plats of corn can not be estimated as readily until the corn is husked. The ears were badly bruised and in some cases the husks were almost all beaten away, leaving the ears exposed to the weather.

Practically no field work was possible at Akron Field Station from September 1 to 10. The grain was too damp to thrash and the soil was too wet to permit tillage and seeding operations. Since September 10, the weather has been very favorable. Thrashing has been completed and much of the larger plat seeding of the Dry Land Agriculture Office has been done.

At the present time exhibits are being prepared for the Akron Field Station display at the Washington County Fair. This fair is to be held at Akron, on September 22, 23, and 24.

All of the field plats of the Cereal Investigations Office have been thrashed. Many high yields were made on the various projects this season. The best yields made in the regular plat series sown in Series IV and V of the Forestry quarter were:

Crop.	Variety.	C.I. No.	Soil Preparation.	Yield, bu.
Wheat-				
Winter	Kanred	5146	Fallow	52.5
Spring	Peliss	1584	"	22.1
Rye-				
Winter	Giant Winter	30	"	15.4 plus 15% hail lo
Spring	Vances'	..	"	12.5 plus 25% hail lo
Oats-				
Spring	Black American	549	"	59.4
	Golden Rain	493	"	59.4
Barley-				
Spring	Coast	690	"	37.2
Emmer-				
Spring	White Spring	1524	"	42.2

The best yields produced by the regular plats on the Cereal Investigations projects were; 28.6 bu. by Rosen (winter) rye; 28.3 bu. by Golden Ball spring wheat, C. I. No. 6227; 65.2 bu. by Kherson spring oats, C. I. No. 459; and 45.1 bu. by Hannchen spring barley, C. I. No. 531-2-09.

Following are the yield data from a varietal experiment with spring oats on soil cropped to potatoes in 1919.

Plat No.	Variety.	C.I. No.	Yield per acre.	Plat area, acre.
1. (Guard)	Kherson	459	58.6	.02
2.	Cole	834	47.6	.02
3.	Kherson	459-5-1-18	60.7	.02
4.	Do	459-6-2-18	63.3	.02
5.	Do	459-8-1-18	63.7	.02
6. (Check)	Do	459	65.2	.02
7.	Sixty-Day	165	54.7	.02
8.	Albion	729-1-1-18	55.4	.02
9.	Do	729-2-2-18	58.3	.02
10.	Do	729-6-3 18	58.2	.02
11.	Burt	823	52.6	.01
12.	Fulghum	839	53.8	.01
13. (Guard)	Kherson	459	76.5	.01

All plats in this experiment were sown March 30. The rate of seeding was 4 pecks to the acre. The stand of plants in plats 6 and 13 was much heavier than that in any of the other plats. Plat No. 9 produced a comparatively poor stand and the grain was thrashed too closely, resulting in a loss to this plat through hulling the grain.

The following yields were obtained from a supplementary varietal experiment with spring oats grown on soil cropped to potatoes in 1919.

Plat No.	Variety.	C.I. No.	Yield per acre.		Plat area, acre.
1. (Guard)	Kherson	459	62.5		.02
2.	Fulghum	?	59.5)		.02
3.	Do		59.4)	Ave. 60.7	.02
4.	Do		63.3)		.02
5. (Check)	Kherson	459	60.9		.02
6.	Aurora	?	62.5)		.02
7.	Do		62.5)	Ave. 63.3	.02
8.	Do	"	64.8)		.02
9. (Guard)	Kherson	459	66.4		.01

All plats in this experiment were sown April 28. The rate of seeding was 4 pecks to the acre.

Following are the average yields obtained in the regular varietal experiment with 9 varieties of spring oats, grown in replicated fiftieth-acre plats, 2 on fallow and 2 on corn land.

	Variety.	C.I.No.	Yield per acre, bu. Fallow.	Corn land.	Average.
Early					
	Nebraska No. 21	841	43.1	38.6	40.8
	Kherson	459	39.1	39.6	39.3
	Burt	293	32.4	32.1	32.2
	Albion (Iowa 103)	729	32.4	30.4	31.2
Midseason					
	Black American	549	55.8	49.2	52.5
	Golden Rain	493	55.6	50.4	53.0
	Swedish Select	134	47.0	48.8	47.9
	Colorado No. 37	617	48.4	40.4	44.4
Late					
	White Tartarian	300	34.0	40.2	37.1

The comparatively low yields made by Albion, C. I. No. 729, and Burt, C. I. No. 293, were at least partially due to low stands in the plats of these varieties. All plats in the experiment were sown at the rate of 4 pecks to the acre. The seeding was done March 29.

WYOMING

Cheyenne Experiment Farm, Archer (A. L. Nelson). The first 10 days of September were very humid, there being but two days in which there was no precipitation. The total precipitation for the month thus far is 0.33 inch. The weather was correspondingly cool during this period but turned to summer temperature during the last five days.

Crops in general are doing well and harvesting is nearly finished. Preparations are complete for thrashing and the putting up of silage. Considerable work has been done on the dairy yards and barn, arranging corrals and tracks for overhead carriers.

Forage and grain crops have produced high yields so far, but there is a large acreage of grain which is in danger of frost. The warm weather of the last few days has greatly improved conditions.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzel). No report.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.) The first half of September has been generally favorable for field work. There has been very little rain and the temperature has remained well above the frost danger mark.

All wheat, oats, barley and flax plats except the June 1 and June 15 sowings of the date-of-seeding and tillage experiment have been thrashed but yields have not yet been computed.

Of the late-sown date-of-seeding and tillage plats the plats in each replication which had been sown June 15 and disked every half month previous to seeding were practically free from Russian thistles. In the plats disked only once or twice previous to seeding June 1 and June 15, thistles were so bad that thrashing will be out of the question.

The most successful Missouri Slope Fair ever held here was held Tuesday, Wednesday, and Thursday of this week. Exhibits of stock, poultry, grain, vegetables, fruit and other agricultural products were especially good. A new feature this year was the contest of agricultural exhibits from six of the surrounding counties. These exhibits, which included grains, vegetables, fruit, and home-canned products, were collected and arranged under the direction of the agricultural agent for each county. Messrs. Stoa and Willard of the experiment station at Fargo were the judges. The exhibit of this county (Morton) was awarded first prize.

Maximum temperature for the first half of September was 87°, recorded Sept. 13; minimum, 39°, recorded Sept. 16; precipitation 0.44 in.

Dickinson Substation, Dickinson (Ralph W. Smith). The thrashing of all cereal plats was finished today with the completion of the increase plats. All varietal plats were thrashed some time ago.

Increase plats of the following varieties were grown: Kubanka, Acme, Monad and Kota wheat; Early Mountain and Golden Rain oats; Hannchen and Swan-neck barley; Russian and Primost flax, and spring rye.

Eight varieties of winter wheat were sown today in duplicate plats in standing corn and five varieties of winter rye were drilled in duplicate plats in flax stubble.

Thrashing in this vicinity is in progress, the weather being favorable for the past week. Previous to that time thrashing was delayed for about 10 days by damp weather. In general the cereal crops are yielding well in this county, some districts near having suffered somewhat from drought.

There was a trace of frost last week but no damage resulted. About 1.5 inches of rain fell the first week of September, but recent dry and windy weather has dried out the soil considerably.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). No report.

WESTERN BASIN AND COAST AREAS
(South to North and West)

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). After much delay caused by storms during August, the harvesting in this section was finished about September 4. Thrashing of headed stacks began soon after harvesting started, but until now only one thrashing outfit has been operating on the Levan Ridge. Most of the grain thrashed during the early part of the season was sold, and now that seeding time is here the farmers who still have their wheat in the stack are in need of seed for fall sowing.

On the station, thrashing was finished on September 13. Preparation for fall sowing of all winter grains is now being made as fast as possible.

Turkey wheat seeded in the rate-and-date experiment has emerged. Before the August 1 and August 15 sowings emerged a heavy hail storm occurred which packed the soil sufficiently to cause some of the plants to crust under, but the September 1 seeding came up with good stands.

Mr. Irving Jensen, who was employed by the State for work on the Nephi substation during 1918 and 1919, has just accepted a position for Smith-Hughes work in Arizona.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens) No report.

WASHINGTON

Adams Branch Station, Lind (W. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). Oat crosses for smut and rust resistance attempted by Dr. Ruth F. Allen were failures. Temperatures unfavorable to pollination were considered to be the cause of

failure, as the thermometers inside the paper bags recorded temperatures from 8° to 10° higher than that of the open air.

The harvesting and thrashing of all the Davis plats have been completed but the weighing and yield calculations have not yet been started. The summer fallowed land to be sown this fall is now being leveled for irrigation in case this becomes necessary.

On August 6 to 12 the oats at Eureka were harvested by Dr. J. A. Logan, Humboldt County farm advisor, and W. W. Mackie. Stem rust which was scarcely noticeable on June 30 was now present in epidemic form. Striking resistance and susceptibility to stem rust appeared in the oats. A number of late side oats were quite resistant, while some of the very early oats escaped by early maturity. Judging from this year's tests, oats which ripen in June will escape rust. Two or three varieties were found to be entirely immune to stem rust.

Mr. Fred N. Briggs has returned from taking smut records on oats at Aberdeen, Idaho. He is now engaged in preparing the land at Davis for the fall seeding.

During the latter part of August, Dr. H. B. Humphrey, in company with W. W. Mackie, inspected the rice station at Biggs for rice diseases and found none. The cereal disease plats at Davis, Berkeley, and Salinas were also inspected. Dr. Humphrey conferred with Dr. Haring, Director of the California Agricultural Experiment Station, Prof. Gilmore, of the Division of Agronomy, and Prof. Horne, of the Division of Plant Pathology, concerning the cooperative cereal disease investigations.

Plant Introduction Station, Chico (V. H. Florell). I attended the State Fair at Sacramento on September 6, 7, and 8. Most of the Agricultural exhibits consisted primarily of the various fruits, although wheat and barley were important parts of the exhibits from the grain producing counties. The principal barleys exhibited were the common Coast and the Mariout recently distributed by the University. The latter was quite prominently displayed and appeared to be well thought of. The principal wheats were the Pacific Bluestem, Early Baart, and Little Club. A good sample of Marquis was exhibited by a grower from Etna, Siskiyou County in Scott Valley, where the altitude is moderately high and the climate cold. The contrast between this sample and the one from the Plant Introduction Garden was very marked. The former was vitreous and of a clear reddish amber color, while the latter was of a much lighter cast with many yellow berries and generally starchy grains. Alaska wheat was also shown as a valuable irrigated wheat by a grower from one of the northwestern counties.

Tabulation of the data for the annual report is now under way. The weather continues fair and is particularly favorable to the fruit men. The past week has been a little too cool to suit the rice men but temperatures are becoming warmer.

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BUREAU OF PLANT INDUSTRY

CEREAL COURIER

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture,
(NOT FOR PUBLICATION)

VOL. 12. September 30, 1920. No. 23
Personnel (Sept. 21-30) and Project Issue.

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PERSONNEL ITEMS

Ira M. Baldwin, who has been assisting Dr. G. N. Hoffer and Ralph H. Carr in corn-disease investigations at La Fayette, Ind., has completed the work for which he was employed and his temporary appointment was terminated September 30.

Harvey E. Brewbaker, field assistant in the barberry eradication campaign in Illinois, resigned , effective September 18, to resume his studies at the University of Illinois.

E. B. Brown returned to Washington September 27 from a two month's trip to Texas and Louisiana, where he supervised the harvesting of corn experiments.

Mrs. Nellie B. Dimmette, stenographer and typewriter in the office of Dr. George M. Reed, has resigned, effective September 30.

Leo J. Federer, field assistant in the barberry eradication campaign in Wisconsin, resigned September 20, to resume his studies at the University of Wisconsin.

Arthur N. Gausemel, field assistant in the barberry eradication campaign in Minnesota, resigned September 9 to resume his position as superintendent of Sibley School in St. Paul, Minn.

Miss Hazel I. Gibbon of Zanesville, Ohio, recently appointed stenographer and typewriter for service in the Washington Office, reported for duty September 21.

Gilbert T. Gilbertson, field assistant in the barberry eradication campaign in South Dakota, resigned September 20 to attend South Dakota Agricultural College.

Harry A. Hass, field assistant in the barberry eradication campaign in Minnesota, resigned September 23 to resume his studies at the Minnesota College of Agriculture and to accompany the live stock judging team of the University of Minnesota on a judging trip.

Albert W. Keech, field assistant in the barberry eradication campaign in Nebraska, resigned September 20 to return to the College of Agriculture of the University of Nebraska.

Forrest D. McCrea, field assistant in the barberry eradication campaign in Indiana, resigned September 16 to accept a position as instructor at the University of Illinois.

Wilfred D. Mills, field assistant in the barberry eradication campaign in Michigan, resigned September 25 to take post graduate work at the University of Michigan.

Joseph H. Permar, field assistant in the barberry eradication campaign in Michigan, resigned September 15 to return to Michigan Agricultural College.

Frank J. Pipal, agent and pathologist, who has assisted in directing the barberry eradication campaign in Indiana, resigned September 30 to enter business for himself in Humboldt, Nebr.

Fred D. Richey left Washington September 22 for Burdette, Ark., to supervise the harvesting of corn experiments.

Lloyd E. Thatcher, field assistant in the barberry eradication campaign in Nebraska, resigned September 22 to return to his position as instructor in zoology in the University of Michigan.

HomerB. Thompson, field assistant in the barberry eradication campaign in Nebraska, resigned September 22, to continue his studies at the University of Illinois.

Otto A. Witt, of Washington, D. C. has been appointed stenographer and typewriter for service in the Washington Office, effective October 1. Mr. Witt has recently been employed in the War Department.

Ferdinand S. Wolpert, field assistant in the investigations for the control of cereal smuts in Illinois, resigned September 30, his work having been completed.

VISITORS

Dr. K. Akemine, professor in the Hokkaido Imperial University, Sapporo, Japan, who is in the United States for the purpose of post-graduate study in plant breeding at Princeton and Cornell Universities, was an office visitor September 25.

Dr. George N. Hoffer, of Purdue University Agricultural Experiment Station, who is engaged in a study of corn root, stalk, and ear rot diseases in cooperation with this Office, was in Washington September 29 for the purpose of examining corn-breeding and corn-disease plats at Arlington Farm.

Senor Vallejo of the Argentine Embassy was an Office visitor September 30, the purpose of his visit being to obtain information regarding sources from which to obtain varieties of wheat for growing in Argentina.

Prof. H. H. Whetzel, professor of plant pathology at Cornell University, was an Office visitor September 27.

C. G. Woodbury, director of the Bureau of Raw Products Research of the National Canners' Association, and formerly director of the Purdue University Agricultural Experiment Station, was an Office visitor September 26.

PUBLICATIONS

The paper entitled "The Daily Development of Kernels of Hannchen Barley from Flowering to Maturity at Aberdeen, Idaho," by Dr. Harry V. Harlan, was published in the August 2 issue of the Journal of Agricultural Research, v. 1, no. 9.

The paper entitled "Occurrence of the Fixed Intermediate, Hordeum intermedium hoxtoni, in Crosses between H. vulgare pallidum and H. distichon palmella," by Dr. Harry V. Harlan and H. K. Hayes, a joint contribution from the Bureau of Plant Industry and the Minnesota Agricultural Experiment Station, was published in the September 1 issue of the Journal of Agricultural Research, v. 1 [illegible], no. 11, p. 373-391, pl. 103-106.

The paper entitled "Genetics of Rust Resistance in Crosses of Varieties of Triticum vulgare with varieties of T. durum and T. dicoccum", by H. K. Hayes, John H. Parker, and Carl Kurtzweil, was published in the September 1, issue of the Journal of Agricultural Research, v. 1, no. 11, p. 383-394, pl. 97-100.

Department Bulletin 644, "The [illegible] Disease of Wheat Caused by Tylenchus tritici, by L. P. Byars, formerly pathologist in the Office of Cotton, Truck, and Forage Crop Disease Investigations, was issued under date of September 27.

Farmers' Bulletin 1176, "Control of Root, Stalk, and Ear Rot Diseases of Corn," by James R. Holbert and George N. Hoffer, was received from the Government Printing Office September 30.

The University of Illinois Agricultural Experiment Station has issued Circular No. 243, entitled Control of Corn Rot by Seed Selection, by James R. Holbert.

Second page proof of Farmers' Bulletin 1168, "Varieties of Winter Wheat Adapted to the Eastern United States", by Dr. Clyde E. Leighty, was read September 24.

Copies have been received of Missouri Agricultural Experiment Station Research Bulletin 37, "Varietal Resistance and Susceptibility of Oats to Powdery Mildew, Crown Rust and Smuts," by Dr. George M. Reed. The experiments reported were planned and for the most part conducted by Doctor Reed while botanist at the Missouri station.

Circular No. 242 of the University of Illinois Agricultural Experiment Station, "Flag Smut and Take-all," by Dr. George M. Reed and George H. Dungan of the University of Illinois, was issued in July.

Page proof of Farmers' Bulletin 1124, "The Brown Spot of Corn, with Suggestions for its Control," by Dr. W. H. Tisdale, was read September 25.

PUBLICATIONS WANTED.

Mrs. Anna H. Kinney, formerly chief clerk of the Office of Cereal Investigations and now connected with the Greeley (Colo.) Potato Experiment Farm of the Bureau of Plant Industry, writes Mr. Bell that an attempt is being made to complete the files of certain publications in the Station library. If any reader of the Cereal Courier can supply any of the publications listed below, mailing them to P. O. Box 747, Greeley, Colo., the favor will be greatly appreciated. The publications desired are:

Bur. Plant Indus. Bul. 21.
Farmers' Bul. 327
Div. Bot. Bul. 2, 4, 14
Div. Pomology Circ. 1,
Div. Veg. Phys. & Path. Circ. 1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 13, 14.
Monthly Weather Review, Vol. 42, Nos. 1-12 and index.
Do. Vol. 43, Nos. 3, 4, 5, 6, 8, 11, 12 and index.
DO. Vol. 44, Nos. 1, 2, 4, 5, 6, 7, 9, 10, 11, 12.
Do. Vol. 45, Nos. 1, 3, 6, 9, 10, 11, and index
Do. Vol. 46, Nos. 1, 2, 7, 11.

PROJECT REPORTS.

218. CEREAL DISEASE INVESTIGATIONS.

(Dr. H. B. Humphrey, Pathologist in Charge.)

213 B. RUST INVESTIGATIONS.

(Dr. H. B. Humphrey, Pathologist in Charge.)

(Barberry Eradication Campaign.)

(Dr. F. E. Kempton, Pathologist in Charge.)

COLORADO: Agricultural College, Fort Collins (John H. Fitzsimmons). Barberry eradication in Colorado during the month of September has been confined mostly to office work, checking and tabulating the results of the campaign to date. Preparation of material for use in making illustrated demonstration cards has also occupied considerable attention.

The rust problem seems to have been a little more serious this year than it was last, in spite of the fact that over 20,000 common barberry bushes were destroyed in the State last year. Most of the infection is on the spring wheat and it is more abundant in the northern part of the State just east of the foothills.

On the final check of the bushes located last year, we find that we met four people who were opposed to removing their common barberry bushes from their property. They had read of the campaign and had been visited by the scouts several times but they would not be convinced that they should remove the bushes. At the present time the matter is in the hands of the State entomologist who will enforce the law and see to it that these four plantings of 500 bushes are removed this fall.

The weather is very fine for this time of the year and we hope to locate several stations where the grain is rusted and to study the germinating power of the spores during the winter.

ILLINOIS: State Entomology Building, Urbana (P. A. Glenn)

INDIANA: Purdue University Agricultural Experiment Station, Lafayette (E.J. Hosmer) During the month of September the rural survey of two counties in the northern part of the State, LaPorte and Noble, was completed. Only twenty new plantings were found this month, all of which were in the country. In nearly every case slight to heavy black rust infections were reported from the nearby wheat fields.

For three months this past summer one of our men has been checking up all plantings for sprouts. Every planting which has ever been reported in 26 counties has been visited and the sprouts where found have been dug out. It is very gratifying to report that only 3.3 per cent of plantings visited contained any sprouting plants.

The following notice appeared in the Goshen, Ind., papers the day after we had located barberries at the Krider Nursery in Elkhart County:

> "The state having condemned the common and purple barberry, we wish to inform our customers that any one who has purchased either of these varieties of us in the past ten years can have same replaced free with Japanese barberry or have purchase price refunded. The Krider Nurseries."

IOWA: Iowa State College, Ames (R. H. Porter). No report.

MICHIGAN: Agricultural College, East Lansing (W. F. Reddy). No report.

MINNESOTA: College of Agriculture, UniversityFarm, St. Paul (Leonard W. Melander). No report.

MONTANA: State College of Agriculture and Mechanics Arts, Bozeman (H. E. Morris) No report.

NEBRASKA: College of Agriculture of the University of Nebraska, Lincoln (James A. Faris). A final checking up was made in Lincoln by one of the field men scouting the alleys on horseback. This method was used because of the difficulty of seeing over the high board fences on foot and the impracticability of doing the job from automobiles. The scheme worked so well that we are planning to use it in Omaha. This method is practical only after a thorough canvass has been made on foot, and should be used for a final check.

Ideal weather favored the rural scouting throughout the month of September; 907 bushes were found, 569 which were in the country. All traces of the rust have practically disappeared from the barberry.

The rust epidemic which materially damaged the late winter wheat and the spring wheat the past season has forcibly brought to the farmers the necessity for measures to control the rust. On every hand the field men are receiving the hearty support of the farmers and business men in the countries where they are working.

Demonstrations at the State and county fairs developed considerable interest in the barberry campaign and we received numerous reports of barberries from the fair visitors. As opportunity presents itself these reports will be verified by the field men .

NORTH DAKOTA: Agricultural College, Agricultural College (George C. Mayou).

(August) Very good weather prevailed during the month. The State leader and eight field assistants located and destroyed 562 bushes, which were in 24 plantings. Fourteen plantings consisting of 293 bushes were located in the rural district and 10 plantings of 269 bushes were found in the towns. In the total, 17 were bushes which had been cut down, but the roots were not entirely eradicated. The bushes of five plantings were heavily loaded with berries containing seeds almost matured.

Since the beginning of the campaign in North Dakota, this is the first season inwhich bushes producing berries have been found. Because of the fact that bushes have been found containing berries nearly matured, a careful investigation has been made of wooded areas to ascertain whether or not any bushes are growing wild in this State. No wild bushes have yet been found in North Dakota, but we are continually on the lookout for them, as they have been found in some of the neighboring States.

In the line of publicity, our eight articles concerning our survey and identification of barberries were published in the leading papers of five counties.

Conferences were held with county agents, county superintendents of schools, county surveyors, county auditors, adjustors of hail insurance, and township supervisors. Our work was discussed in a general way at those conferences with the aim of getting cooperation and assistance for our campaign and teaching the damage and identification of the common barberry.

In the month of August 36 per cent of Traill, 5 per cent of Steele, 95 per cent of Grand Forks, 65per cent of Walsh, 80 per cent Pembina, and 1 per cent of Renville Counties were completely scouted from farm to farm, including the rescouting of all towns in the same territory.

(September) The task of eradicating the common barberry is progressing well in North Dakota. However, not so much territory has been covered this month as in the previous months because the roads in Dickey County are in very poor condition. Another reason is that Sargent and Pembina Counties have a heavy growth of shrubbery, which requires careful scou ting

Some follow-up work on barberry locations of last year and on barberries which have been located through our demonstrations at fairs has been conducted this month. Twenty-nine sprouts on 3 properties were found. Several leads to barberries have been reported from different parts of the State. All leads which are reported will be checked as soon as possible. A record of such reports is kept at this office so that a check on them can be made at any time. When any one reports that they have barberry bushes, I ask them to mail me a sample of what they think is barberry. in order to avoid the mistake of eradicating harmless bushes.

A lady living in the country near Grafton, eradicated a large rose bush hedge, thinking that it was barberry. She seemed very much interested in our work, and, because of her belief that the barberry bushes have a comection with the black stem rust, she eradicated her hedge.

During the month, 568 bushes found on 22 properties were located and destroyed. In Walsh County, which is 95 per cent scouted, 241 bushes were found. A man who claimed to know conditions declared there were no barberries in Walsh County and that it would be a waste of time and money to scout that county. I believe that this is conclusive evidence that no one knows the exact conditions of the territory in regard to barberries without having made a thorough farm to farm survey as well as a survey of all the towns.

OHIO: College of Agriculture of Ohio State University, Columbus (John W. Baringer). In the early part of September the task of eradicating a large planting of escaped barberries near Bellefountaine, Ohio, was completed. Field assistants had labored for weeks among dense undergrowth, stones, and poison ivy, assisting farmers in locating and eradicating the largest and most destructive planting of escaped barberries which has come to our attention. Although that location will require careful watching for a period of atleast five years, in order to get all of the sprouts, barberries are not likely ever to be tolerated in that vicinity again. Wheat and oat fields had been affected, in favorable rust years, for a distance of 3 miles from the escaped barberries.

The original farm-to-farm survey and the original survey of all towns, large and small, in Green, Montgomery, Preble and Van Wert counties has been completed. An original farm-to-farm survey is in progress at present in Darke and Mercer

school
counties. Recently, we have inaugurated a rural camp [illegible] which will be conducted along with the farm-to-farm survey.

SOUTH DAKOTA: College of Agriculture, Brookings (H. C. Gilbert)
During September the farm survey work has been continued, completing Duel and Moody counties. All but three and one-half townships in Minnehaha County were surveyed, as were three townships in Lincoln County. In this area barberries were found on 23 farms, with a total of 457 bushes.

A demonstration put on at the State Fair September 13 to 18 took considerable time from the field work but created a great deal of interest and was well worth while. Three of the field men left during the month to return to college. We have not been able to cover as large an area in our rural survey as in previous months but have found a considerable number of barberries and abundant proof that there are more than enough barberries in the State to cause severe rust epidemics annually until the barberries can be found and removed. The work this month gives additional proof to our belief that there are a large number of farms in the southeastern part of the State. on which barberries have been planted.

WISCONSIN: Department of Agric. State Capitol, Madison, Wis. (Noel F. Thompson.)

(August) The barberry campaign in Wisconsin progressed steadily during August. Two counties have been practically completed in a farm-to-farm survey and work has been started on a third which we hope to be able to complete in September.

Barberries were found wild on 25 different farms, but in most cases the number of plants was small and the area infected limited. One of these had its source in a double hedge about 60 feet long. The farmer estimated its age as 69 years. It was alongside a rocky field and in clearing the land they had piled the stones among the barberries until the hedge was growing from the top of a stone wall some 4 or 5 feet high.

(September). During September we have completed the scouting and rechecking of the third county this summer. There are a few barberries still remaining but we hope to have these out this fall.

We have also eradicated the barberries from one badly infested area at Milton Junction. There were about 4,000 wild bushes scattered over an area nearly 5 miles in diameter. We had a crew of five laborers who dug the bushes from an old nursery in the center of the area while our scouts located the bushes in the surrounding farms and secured the cooperation of the owners in their eradication. The scouts worked out in all directions from the nursery until they reached what seemed to be the limit of the infestation.

We also started the eradication of the barberries on a farm near the Mississippi River in Grant County. Last year a scout looked at this farm and estimated 3,000 barberries. Later the owner reported that he had removed 3,000 bushes but there were a lot left. We sent two scouts to the farm to clean it up if possible. They found barberries scattered thickly over a pasture and woodlot of more than 300 acres. About thirty years ago the owner had planted a barberry hedge near his house and bordering the pasture. The plants grew very rapidly and soon bore seed. The cattle in the pasture evidently ate these seeds

and so distributed them over the entire 300 acres where many sprouted and developed into plants. Evidence for this was found in seeing the cattle eating the barberries, by finding many seeds in the manure dropped in the pasture and by finding as many as 100 small plants growing in an area approximately the size and shape of droppings from cattle. Further evidence of distribution by cattle was afforded by finding the barberries growing very thickly within the pasture but ending abruptly at the fence. We estimated 33,000 large bushes ten years of age or over and some 1,300,000 smaller ones. A crew of nine men working for ten days under the direction of the scout eradicated all the plants old enough to bear seed and many thousands of the smaller ones. Next year we hope to have most of the remaining plants destroyed.

WYOMING: College of Agriculture, University of Wyoming, Laramie (Ralph U. COTTER) Up to September 26, the towns in Albany, Laramie, Platt, Goshen, Converse, and Natrona had been visited. No rural survey has been begun as yet. A total of 2,666 bushes was found and 17 removed; 236 bushes were found to be infected and 66 sprouts were located. The sprouts are being removed and promises have been given that a number of the other bushes will soon be eradicated.

CEREAL DISEASES IN KANSAS.

The following report on the occurrence of cereal diseases in Kansas has been received from Dr. L. E. Melchers.

Wheat Stem Rust.-- Generally, wheat stem rust was not serious in Kansas the past season. If it had appeared in the same amount a few weeks earlier no doubt serious injury would have resulted. The rainy spells stopped in sufficient time and very good weather for maturing the crop continued until harvest. Perhaps some of the worst of the rust appeared in Ellis and parts of Rush and Rock counties. There was some rust in many counties in the main hard wheat district, especially on low land. Strange to say, the eastern tier of counties in Kansas was remarkably free. Any number of cases were found where fields of Kanred were growing either across the road from or adjoining fields of Turkey or Kharkov and the difference in rust was very striking. In many fields merely a trace was noticed on Kanred while as high as 50 or 60 per cent, using the scale for estimating rust, showed on theadjoining fields.

Leaf Rust. Leaf rust was exceedingly rare in Kansas the past season. There was no injury whatsoever caused. This is interesting in view of the fact that the year before, one of the worst epidemics of leaf rust hit Kansas that has occurred for many years.

Wheat Scab. -- In 1919, traces to 5 per cent of wheat scab were found in a few of the eastern counties in Kansas, as shown by the Plant Disease Survey. This year for the first time distinct injury occurred in Labette County as well as some injury in adjoining counties. In Labette County in particular, very many fields were reduced at least 25 per cent in yield due to wheat scab. Climatic conditions were very favorable for this disease the past year. It is of interest to note that in August, specimens of corn root rot had been sent from this same county. According to county agent reports, the injury from scab in many fields is serious.

Corn Root Rot.-- This disease is apparently becoming more conspicuous in Kansas. The past season was perhaps somewhat favorable for its development. In plats at Manhattan the injury is showing up very noticeably. Two definite reports, one from Labette and another from Doniphan County, show that it is quite prevalent. There is no question that the disease is present in greater or less quantities in every field in the State.

Corn Smut.-- Corn smut is apparently more prevalent this year than it has been for a number of seasons. Many fields will run from 30 to 40 per cent smut.

Sorghum Smut. -- Many inquiries are coming in the Station for treatment to prevent sorghum smut. Fields examined show more kernel smut than usual. The head smut of sorghum has been showing in unusual and almost alarming quantities at Hays, Kans., in some experimental plats. Some special work on the overwintering and viability of spores, when smutted sorghum has been placed in the silo and fed to stock will be conducted.

Wheat Smut. -- By far the greatest epidemic of bunt in many years struck Kansas the past season. No records available show that it has ever been as prevalent. Many fields showed as high as 40 or 50 per cent of smut. Two of the worst counties in the State were Rice and Barton. Many others throughout the hard winter wheat district showed all the way from a trace to 20 per cent infection. A campaign for seed treatment has been launched.

Black Chaff Disease.-- There is no question that hundreds of acres of wheat were planted with seed that came from diseased fields the previous season. We have no evidence in this State that seed treatment is of practical value and all the evidence to show that everything depends upon climatic conditions as to whether this disease will cause injury or not.

Root Rot.-- Several complaints have come from different parts of the State concerning wheat plants dying out in spots. The injury, which is of a fungous nature, is rather complex and no definite organism has been associated as yet. Work is being done on this problem.

Wheat Root and Culm Infection.-- Several instances have been reported and specimens examined of a culm infection which seems to be due to an Alternaria species. The culms become brittle at the nodes and break. Considerable loss due to the breaking over of heads have resulted in some fields. This matter is being given attention.

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Official Messenger of the Office of Cereal Investigations
Bureau of Plant Industry, U. S. Dept. of Agriculture.
(NOT FOR PUBLICATION)

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Personnel (Oct. 1-10) and Field Station (Sept. 16-30) Issue.

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PERSONNEL ITEMS

Aaron F. Bracken has been appointed collaborator, effective October 1, his appointment as scientific assistant in charge of cooperative cereal field experiments on the Nephi Experiment Farm, Nephi, Utah, having been terminated September 30 because of the necessity for reducing office expenses. This action is a part of the retrenchment made necessary by the reduced appropriations for the fiscal year 1921, Mr. Bracken having been continued on the roll since July 1 in order to obtain data on experiments conducted in 1920. He will be retained as superintendent of the Nephi substation by the Utah Agricultural Experiment Station.

Lester W. Bullard, field assistant in the barberry eradication campaign in North Dakota, resigned September 30, his temporary appointment expiring at that time.

Charles E. Chambliss returned to Washington October 4 from a two months' inspection trip of rice experiments in California and Louisiana.

Anton E. Flamer, field assistant in the barberry eradication campaign in North Dakota, resigned at the expiration of his three months' appointment on September 30.

Miss Esther Harms, stenographer and typewriter under the direction of James A. Faris at Lincoln, Nebr., resigned October 2 to accept a position with a private concern.

William Herrling has been appointed laborer, effective October 1, to assist in the investigations of imperfect and rac fungi under the direction of Dr. A. G. Johnson at Madison, Wis.

Max A. McCall has been appointed collaborator, effective October 1, his appointment as agent having been terminated September 30. This action is a part of the program for the reduction of expenses made necessary by the reduced appropriations for the fiscal year 1921. Mr. McCall has been continued

since July 1 to obtain results of the 1940 experiments. He will be retained as superintendent of the Adams County Branch Station, Lind, Wash., by the Washington Agricultural Experiment Station.

F. D. Richey returned to Washington October 8 from a 10-day trip to Arkansas and Missouri, where he supervised the harvesting of experimental plats of corn.

Albert S. Severson, field assistant in the barberry eradication campaign in North Dakota, resigned at the expiration of his three months' appointment on September 30.

A. F. Swanson has been assigned to assist the Office of Farm Management and Farm Economics in a survey to determine the cost of producing winter wheat in Missouri, Nebraska, Kansas, and Oklahoma. The work will be under the direction of Mr. L. A. Moornouse and will be begun in Pike County, Mo., October 12. A portion of Carroll County, Mo., will then be surveyed and this will be followed by survey of an area in Gage County, Nebr., and of other areas in the States named. It is expected that the work will be completed in six or seven weeks.

Dr. W. H. Tisdale arrived in Washington October 6 from Crowley, La., to confer relative to the preparation of two papers embodying the results of his investigations on straighthead and the sclerotium seedling blight of rice. He left on October 8 for Madison, Wis., where he will spend several months in the investigation of certain physiologic aspects of a number of rice-disease problems.

VISITORS

Raymond Fogelman, formerly of this Office, was a visitor on October 5. While here, he received an appointment with the Office of Forest Pathology.

John Allan A. Millar, commercial attache of the Swedish Legation, was an Office visitor October 6. The object of his visit was to arrange for the introduction of improved varieties of seed cereals into the United States and their testing at experiment stations.

J. R. Quaintance, superintendent of the New Iberia Live Stock Station, Jeanerette, La., was an Office visitor October 1, when he discussed the possibilities of cereal production in southern Louisiana.

ESTIMATES WANTED ON NUMBER OF SPEAR SAFETY ENVELOPES NEEDED.

During the fiscal year 1920 the Office used the following quantities of the Spear Safety envelopes for seed packets:

2,000	12-ounce,	7,000	4-ounce,
5,000	6-ounce,	7,000	2-ounce.

The price of these packets is now more than double what was formerly paid for them, and the cost of duplicating an order for the above-named quantities would be several hundred dollars. Please advise at your early convenience the number of these packets in each of the various sizes which you will need to obtain between now and the end of this fiscal year in addition to those you may now have on hand. In making this estimate, please consider also the possibility of using the much cheaper coin envelopes instead, especially in the smaller sizes.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). (Sept. 25) Weather conditions have been excellent for harvest during the past two weeks, save the first two days of this week, when the storm was near us, and we had cloudy weather and a little rain. The main part of the storm was between here and New Orleans. We had no wind to speak of.

We have been harvesting for some time, and if nothing prevents will complete all large plats next week. We are securing good yields, and experiments are showing up very nicely.

On the 6th instant, I went to Elton to inspect fields of Fortuna rice. I was told that there are about 1,000 acres of this variety in that vicinity, and all that I saw was good and clean; well suited for seed purposes. One farmer had a field of 125 acres that he was harvesting, and expected an average yield of 16 to 18 bags. All men growing this rice are well pleased and expect to increase their acreage of it another year.

Farmers are having excellent weather for harvest, but are rather blue over the prices. Unless something is done to increase the price, many will lose money and few will come out even, on account of the very high cost of producing this year's crop.

GEORGIA

State Experiment Station, Athens, and Substations (R. A. Onlas). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). The oat and barley nurseries were sown during the past 10 days. Seeding was begun on the fortieth-acre oat plats September 29, but the completion of this work will be delayed owing to the present rain.

About a half-acre of buckwheat containing several varieties and selections was harvested the latter part of September. Two foreign varieties have not as yet set seed.

Fourteen fortieth-acre plats of wheat, the first of Dr. Leighty's rate-and-date-of-seeding and method-of-soil-preparation experiments, were sown September 16. The results of this experiment in the season of 1919-1920 were as follows:

Rate of seeding, pecks	Yield per acre, bu.	Date of seeding	Yield per acre, bu.	Preparation of land	Yield per acre, bu.
2	24.9	Sept.15	21.9	Disked	28.5
3	26.4	Oct. 7	28.9	Plowed	26.1
4	26.3	Oct. 30	28.4		
5	26.7				
6	29.2				
7	28.6				
8	29.0				

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love). During the early part of September the threshing of wheat and rye was completed and material weighed out for the nursery and plat seeding. An extensive sowing of new hybrids was made in addition to over 3,000 rod rows of wheat. In addition to this nursery series, a number of the more promising sorts have been sown in drill plats for further testing and multiplication of seed. Increase plats of our best Dawson Selection, No. 522-68, and of our best red wheat, Selection No. 123-32, were sown. In addition to this, enough of the Dawson selection was furnished our Farm Department so that a 6-acre increase field has been sown. Some four or five farmers were also furnished from 3 pecks to 2 bushels of this seed. These men expect to multiply this and develop sources of seed.

A number of new selections of rye were sown in rod rows and the best of the earlier selections have been continued in a rod-row series. In addition to the work at Ithaca, extensive sowings of rye are now being made in Columbia and Albany counties and a series of wheat plats has been sown in Genesee County.

A number of new hybrids between some of our best selections and varieties like Odessa and Kanred have been sown in our hybrid series this year. The second generation of these crosses will be harvested the coming summer. It is hoped that out of the Kanred crosses some types adapted to New York will be obtained which at the same time are quite rust resistant. We are now getting material ready for the seeding at Chico and in the greenhouse.

Abundant rains have fallen since our grain has been sown and all of the material is coming nicely.

Among the graduate students who are majoring in plant breeding, the following men are conducting problems in connection with cereal improvement: Ernest Dorsey, cytological study of sterility in wheat species crosses; E. A. Southee, study of the inheritance of hardness or quality in wheat; C. F. Noll, study of the inheritance of earliness in winter and spring habit of oats, together with related characters; H. P. Cooper, study of the inheritance of hardiness in hybrids of spring and winter wheat; M. C. Gillis, inheritance studies in barley and S. M. Dietz, inheritance of rust resistance in oats. The studies of these men add much to the amount of work we are able to do in cereal investigations and at the same time keep up the interest in these experiments.

INDIANA

Indiana Agricultural Experiment Station, LaFayette (H. S. Jackson and E. B. Mains). No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert) No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). The weather during the latter half of September was generally favorable for maturing the corn crop. The quality of the crop will be considerably better than was expected two weeks ago. About 50 per cent is safely mature, while a few late-planted fields in the east central part of the State will require about ten days more.

About half of the wheat has been sown in the northwestern part of the State and a considerable proportion in the southwestern part. Wheat sowing is now beginning in the eastern part of the State. We shall sow our wheat on the station field about October 6.

The leading varieties of barley on the station field during the last season were as follows: *

Variety	C. I. No.	Yield, bu. per acre
Lion	923	16.93
Sandral	937	17.83
Luth	906	17.53

GREAT PLAINS AREA (South to North)

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). The last half of September was dry and cool, with one or two windy spells. Sorghums and broom corn have ripened rapidly. On September 29 and 30 we had a light frost which nipped the sorghum leaves, the minimum registered being 33°. It is questionable whether the later dates of sorghums will mature or ripen now or whether the plants are set back so much that they will not ripen properly.

* Nebraska No. 21 oats on the same field yielded 41.07 bushels.

All of the broom corn with the exception of the nursery is harvested, as are the grain sorghum varieties with the exceptions of shallu, darso, and Schrock kafir. Some of the later-sown sorghums were not ripe, so were still standing to see if they would ripen.

Work during the past two weeks has consisted mainly of counting stalks and heads of both broom corn and sorghums, selecting seed heads of the various sorghums, and harvesting sorghums and broom corn.

There has been no rain during the last half of September.

Professor L. E. Call of the Kansas State Agricultural College, visited the Station for a short time on September 26.

KANSAS

State Experiment Station, Manhattan (John H. Parker). During the third week in September, the weather was warm and dry with temperatures above normal. No rains were reported from any sections of the State. This weather was ideal for the maturing and harvesting of corn and sorghum. Corn cutting and silo filling were general. The soil was in splendid condition for seeding wheat, there being plenty of moisture in nearly all parts of the State.

During the last week in September there were good rains in the eastern and some of the central counties but the soil in the western counties was becoming too dry for germination and best growth of wheat. The weather was warm in most parts of the State until the last few days of the month. There were killing frosts in nearly all sections of the State on the 29th and 30th. Corn and sorghum were matured with the exception of a small percentage of the acreage in certain counties. Wheat was from fifty to one hundred per cent seeded in all the western half of the State and was up in many localities.

The highest temperature at Manhattan was 92° on September 15 and 21, and the lowest, 30°, on September 30. The mean maximum temperature for the month was 80.3° and the mean minimum 54.1°. Rain fell on ten days and the total for the month was 4.22 inches.

Wheat varieties in plats at the Agronomy Farm were seeded on September 27 and the plats sown with the furrow or lister drill compared with the common drill were sown at about the same date. A rate-of-seeding test has been started with Alberta Red, Kansas No. 20+8, C. I. No. 5797. This is the variety which produces very little yellow berry but which does not yield as well as Kanred. The purpose of the rate-of-seeding experiment is to find out whether heavier seeding will increase the yield. It has been shown by previous experiments that this variety does not stool as much as either Kanred or Turkey.

Seeding commenced in the Crop Improvement nursery on September 29 and was completed on October 6. This nursery includes about 3,000 rod rows of varieties and selections, about 500 head rows; and about 2,300 eight-foot rows of F_4 Winter x Spring wheat hybrids, nearly all of the beardless type; and about 600 rows of F_2 hybrids made for the purpose of increasing winter hardiness in wheat; and about 1200 eight-foot rows of F_3 hybrids between Turkey and Odessa, also a part of the winter hardiness project.

During the last week in September the two hundred head rows of Standard Blackhull kafir grown at the Agronomy Farm were headed. These heads have been spread out to dry in the crops store room in the barracks and will be thrashed and yields determined later this fall. These head rows were exceedingly uniform, probably due to the fact that this variety has been carefully selected to a uniform type for several years. It is possible, however, that there may be significant and hereditary differences in yield which are not apparent from field observations. There was an unusually high percentage of diseased heads in the general fields which were prevented from properly filling out and maturing by damage from plant lice which were present in large numbers between the leaf sheath and the stem just below the head. Many of these stems were badly rotted and were covered with a sticky red fluid. It is not known whether the aphids or possibly a bacterial disease were the primary cause of the trouble. The general field of Blackhull kafir at the Agronomy Farm will be headed by hand instead of by cutting with the corn binder as usual. This method of harvesting has been made necessary by the large number of late immature heads which developed on suckers caused by wet weather late in the season. All of the crop will be sold for seed; therefore, it is important that only the mature, normal seed be saved.

The corn husking in the nursery has been completed, and harvesting of bagged heads from the sorghum nursery, including those from the Red Amber Feterita crosses, will be completed this week.

Professor L. E. Call spent the last two weeks of September in an automobile tour through southwestern Kansas in company with Mr. G. S. Knapp, State Irrigation Commissioner. Particular attention was given to the grain sorghum crops and a day was spent at the Woodward field station.

Professors Call and Salmon visited the Colby Experiment Station on October 5.

Professor G. R. Hyslop, Professor of Farm Crops of the Oregon Agricultural College spent October 7 at the Station.

Professor L. E. Melchers gave a talk before the International Wheat Congress at Wichita on October 7 on wheat diseases and also spent several days during the same week in north-eastern Kansas in connection with corn root, stalk and ear rots. The County Agents in several counties have reported severe damages from these diseases, in one instance in the same locality where wheat scab was serious a year ago.

Mr. Ivan White, who has had charge of the corn smut and ear rot experiments at the Kansas Station for several years, resigned on October 1 and will engage in truck farming in Texas. Mr. C. O. Johnston, previously engaged in cereal rust work at this station, will from now on have direct charge of all cereal disease experiments.

The ear-to-row experiments with commercial white corn in the corn smut and ear rot experiments are now being husked and yields determined. There is an unusual amount of Fusarium present on corn here, due probably to the wet weather in August.

Several experiments withstinking smut are being started at the Kansas

Station this fall. These will include studies in varietal resistance in wheat, using both the eastern and western species of smut, time-of-seeding experiments, and various seed treatments. There will be no rust nursery planted this year.

Fort Hays Branch Station, Hays (A. F. Swanson) The first killing frost came September 29 and was followed by a heavier freeze September 30. All row crops were completely killed. Since September 20 we have had considerable wind which has been severe on the sorghums and at the same time left the ground rather dry for winter wheat. A rain of a half inch on September 25 was of considerable benefit.

All of the sorghums on the Cereal Project were harvested before frost except the late date-of-seeding Dawn kafir, which failed to mature. All of the necessary sorghum seed for next year's planting has been selected and placed in a dry seed room.

The seeding of experimental wheat was started September 30 and will be completed October 2, including the nursery rows. Experiments with wheat will include varietal comparisons of hard and soft winter wheat and rye; top-dressing experiment; furrow drill vs. common drill; and rates and dates of seeding. The winter hardiness nursery will include about 25 additional strains and varieties.

In fields that were not properly handled there is a heavy infestation of Hessian flies, so that there is a possibility of considerable damage to next year's crop. Most of the wheat seeding is about completed among the farmers of this vicinity.

The wind is doing considerable damage to the frosted sorghums and unless they are harvested soon most of the leaves will have blown away.

The writer made a trip to the Tribune Experiment Farm September 27 to inspect the sorghum work. A frost the day before severely injured all growing row crops. All of the grain sorghums except a new variety called Sudan corn failed to mature fully. Of the forage crops Red Amber sorgo was outstanding, followed by Freed sorgo. Some corn will be grown in this vicinity, which has a high altitude and low rainfall.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman).

The latter part of September was dry, windy, and cold in this section. No precipitation worth mentioning was received. The first freezing temperature was recorded September 25, while the lowest temperature reached during the period was 25 degrees F. on September 27.

Fall work in eastern Colorado is progressing rapidly. Possibly more than 80 per cent of the fall wheat has been sown. The unusually good yields of wheat obtained here this season has stimulated the growing of this crop. It is likely that even a larger acreage of winter wheat will be sown this fall than was sown last fall. At present the soil is too dry to germinate the seed. Very little wheat sown since early in September has germinated well, due to the dryness of the soil.

The corn and sorgo crops were far enough advanced to be only slightly injured by the frosts during the latter part of September. A large percentage of these crops had been cut before the frosts came. The feed crops in north-eastern Colorado are unusually good this season. Some fields of sorgo will yield around 3 tons of dry forage to the acre. Corn husking has already started. Many fields of corn in this section will yield 40 bushels to the acre and a few may yield considerably more.

The Washington County fair, which was held at Akron, September 22, 23, and 24, was a decided success. The weather during the last two days of the fair was rather disagreeable, due to wind and dust, but the attendance was very good. The quality and quantity of farm products on display was a distinct credit to the country. The improvement of the exhibits over those of the fair of 1919 was very marked. This was partially due to the fact that 1920 was an unusually favorable year in northeastern Colorado, and partially due to the increased interest in better farming.

Work on Akron Field Station is progressing favorably. Unless the weather changes decidedly, most of the fall work other than corn husking will have been completed by October 10. Dry weather throughout nearly the entire month of September has given us a chance to bring our work up in good shape.

The third seeding in the rate-and-date experiment was made September 16. The varietal experiment with winter wheat was sown the same day. This wheat is emerging very unevenly, due to the dryness of the soil. Very little of the wheat sown on corn land has emerged at all, and only part of that sown on fallow has emerged. The heavy rain during the first few days of September crusted the soil to such an extent that it was necessary to harrow the plats of the September 1 seeding in the rate-and-date experiment. As a result the stands in the plats of that seeding are very poor.

Nursery seeding is now well under way. It is not likely that the nursery grain will emerge before a rain is received.

Following are the yield data from a varietal experiment with 15 spring wheat varieties, sown in four replicate fiftieth acre plats, two on fallow and two on corn land, at the Akron Field Station in the season of 1920.

Class and Variety	C.I. No.	Average Yield in bushels per acre: Fallow land	Corn land	Average
Durum-				
1. Kubanka				
Monad	3320	18.6	11.2	14.9
Arnautka	1493	17.7	12.7	15.2
Kubanka	1440	17.0	12.7	14.8
Acme	5284	17.1	12.1	14.6
(a)Arnautka	4064	16.7	10.8	13.8
2. Pelissier				
Peliss	1584	20.6	13.2	16.9
3. Red D'm.				
(b) D-5	3322	18.9	12.4	15.6
4. Misc. D'm.				
Golden Ball	6227	18.3	12.3	15.3
Common -				
1. Fife				
Marquis	3641	15.8	13.1	14.4
Glyndon	2873	15.1	13.2	14.1
2. Preston				
Converse	4141	18.5	15.2	16.8
Pioneer	4324	17.1	14.0	15.5
3.Miscellaneous:				
(c) Kota	6248	20.4	17.1	18.7
Galgalos	2398	19.8	16.8	18.3
Kitchener	4800	16.4	14.8	15.6
(d) Prelude	4323	14.5	8.6	11.5

(a) Very poor stand on all four plats.
(b) Fallow plat No. 2 was 3 feet short This loss was accounted for.
(c) Plat No. 2 on each soil preparation was sown at 3-peck rate, due to lack of seed
(d) Losses of 10, 50, 20, and 15 percent in plats 1 to 4 inclusive, accounted for in yield data.

All plats in this experiment were sown March 27, 1920. The rate of seeding was 4 pecks per acre in all plats excepting the two south plats of Kota, C.I. No. 6248

Following are the yield data from a varietal experiment with spring wheat, grown in single fortieth-acre plats on ground cropped to potatoes in 1919.

Variety	C.I. No.	Yield bu.	
Arnautka	1493	21.2	Guard plat
Erivan	2897	22.9	
Preston	3041	14.3	
Ghirka Spr.	1547	17.9	
Beloturka	1580	20.2	
Arnautka	1493-7-12	20.4	
Arnautka	1493	19.6	Check plat
Taganrog	1570	29.5	
Peliss	1584	26.7	

Variety	C.I.No.	Yield bu.	
Laramie	6235	13.5	
Arnautka	1493	21.9	Check plat
Power	3697	15.4	
Haynes	2874	12.5	
Golden Ball	6227	28.3	
Red Bobs		12.5	
Ruby	6047	15.8	
Arnautka	1493	21.7	Guard Plat

All plats in this experiment were sown at the rate of 4 pecks to the acre. With the exception of Red Bobs and Ruby, all plats in the experiment were sown March 28. These varieties were sown April 28.

Following are yield data from a varietal experiment with spring wheat grown in fiftieth-acre plats on ground cropped to potatoes in 1919.

1.	Arnautka	1493	14.5	Guard Plat
2.	Ruby	6047	17.1	
3.	Red Bobs		12.5	
4.	Kahla durum		11.2	
5.	Do.		12.7	
6.	Arnautka	1493	10.8	Guard Plat

All plats in this experiment were sown April 28. The rate of seeding in this experiment was 4 pecks to the acre.

Following are the data from a rate of seeding experiment with Arnautka spring wheat, C. I. No. 1493, grown in four replicate fiftieth-acre plats, two on fallow and two on corn land, at the Akron Field Station in 1920.

Rate in pecks	Fallow land	Corn land	Average
3	19.4	10.9	15.1
4	17.7	12.7	15.2
5	17.1	12.5	14.8
6	18.3	12.5	15.4

All plats in this experiment were sown March 27. The 4-peck plats in this experiment were also used as the varietal plats of this variety.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson) Weather conditions for the past month have been quite favorable. Frost occurred on September 26, the temperature being 28°. Most of the silage crops were harvested and the remainder was not greatly damaged. The sunflowers at the station escaped injury from frost with a temperature of 26° which occurred September 29.

The rainfall has been somewhat lighter than usual, the total for the month being 0.88 inches. There was only 0.05 inch during the last fifteen days.

A new silo, 14 feet in diameter and 35 feet high, has been built at the station during the past week and is ready to fill with sunflower silage.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W.E. Brentzell)

Dr. . H. Evans from the Office of Experiment Stations was a visitor September 28.

Flax thrashing operations have been very much hampered by rains during the last two weeks. The various strains of flax growing in the wilt test plat have been thrashed and many of the varieties in this plat are being thrashed. The fiber flax varieties have showed remarkable resistance to wilt this year. Many of the seed flax varieties also have resisted well and some of these show much improvement in respect to yield over the standard resistant varieties which are now being grown in commercial fields.

Northern Great Plains Field Station, Mandan (J.C. Brinsmade, Jr.) The weather during the latter half of September has been growing progressively colder, until September 29, when the first frost of the season occurred. On September 30 a minimum temperature of 25° was recorded. This was not severe enough to damage winter wheat and flax still standing green in the field.

Winter wheat in the winter hardiness experiment sown August 30 has made good growth. The soil was moist at the time of sowing and the germination was apparently about 100 per cent.

All grain and flax from plats has been cleaned. Yields of cereal varieties are as follows:

Spring Wheat		Oats		Barley	
1. Kota	9.2	Golden Rain	29.3	Svanhals	18.1
2. Power	8.2	Swedish Select	29.1	Hannchen . .	16.0
3. Preston	7.8	Victory	28.9	Manchuria	12.8
4. Marquis	7.6	Sixty Day	23.5	Coast	11.4
5. Haynes	6.8	Early Mountain	22.5	White Smyrna	11.3
6. Monad	6.8	White Russian	19.7	Mariout	10.8
7. Arnautka	6.7				
8. Acme	6.7				
9. Kubanka	4.0				

The low apparent yield of Kubanka is accounted for by the fact that it was thrashed at the same time as the D.L.A. rotation plats of Kubanka. The latter plats were more severely infested with Russian thistles and consequently required more wind to clean them than the wheat varietal plats which were thrashed later. Some of the Kubanka from the varietal plat probably was blown over in thrashing.

Some late flax in rows still remains to be harvested and all the flax nursery from clean and diseased land remains to be thrashed.

Maximum temperature for the last half of September was 93°, recorded September 18; minimum, 25°, recorded September 30; precipitation, 0.65 inch.

Dickinson Substation, Dickinson (Ralph W. Smith) Most of the month of September was warm and the weather was favorable to fall work, except for about 10 days when damp misty weather delayed thrashing. The total precipitation for the month was 1.77 inches, most of which fell during the past week. This rain will insure the germination of the winter wheat and rye which, due to the dry condition of the soil, had not germinated before the rain. The first killing frost of the season occurred September 29, with a minimum temperature of 21°.

Thrashing at the Substation is completed with the exception of the cereal nursery. About 400 rod rows of winter wheat were sown in the nursery, including hybrids and selections made at this and other stations.

Eight varieties of winter wheat were drilled in duplicate plats in standing corn and five varieties of winter rye were sown in duplicate plats in flax stubble.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May) Practically all of the thrashing on the Station farm has been completed. About 5 acres of flax, a similar amount of oats, and the cereal nursery remain yet to be thrashed. The busy season is approaching the end.

The spring cereal nursery material has been brought under shelter but has not been thrashed. The winter wheat nursery material was thrashed Monday and Tuesday of this week (Sept. 27-28) and I have cleaned and weighed the grain and begun to sow the nursery. The highest yielding hybrids were crosses between Buffum No. 17 and Ghirka Winter. These hybrids yielded at the rate of about 30 bushels per acre but were late in maturing and received the benefit of the late rains.

The varieties inthe replicated plats, which were sown on the 17th, are and the wheat emerging in the furrow drill experiments which was sown on the 1st has attained considerable height.

Official visitors at the Station during the month were Prof. P. V. Cardon, agronomist of the Montana Agricultural Experiment Station, on the 8th and 9th; Mr. Person and Mr. Emerson of the Northern Great Plains Field Station, who were here on the 17th and 21st, respectively, inspecting the shelterbelt work; and Prof. Pinckney, chemist of the Montana Station, on the 27th.

Precipitation for the month of September was .66 inch which is less than half of last year and of the average for the last 22 years. We have had about 3 real light frosts.

WESTERN BASIN AND COAST AREAS
(South to North and West)

UTAH

Nelson Substation, Nephi (Aaron F. Bracken) The weather observations for September showed a maximum temperature of 88 degrees on the 5th, and a minimum temperature of 26 degrees on the 25th. The precipitation for the month amounted to .59 of an inch.

The sowing of 1200 rod rows of winter wheats in the nursery has just been completed. Potatoes in all the rotation experiments have been dug, and corn in the same experiments has been harvested. This work together with preparation of all experiments for sowing to winter wheat has kept the station force busy during the last two weeks.

The yields of winter wheat in the regular varietal experiment follow:

Variety	C.I.No.	Yields in bushel per acre Ser.1	Ser.2	Ser.3	Ave.
Minturki	6155	36.0	38.2	32.0	35.4
Triplet	5408	26.0	26.3	24.0	25.4
Minhardi	5149	18.7	27.0	29.7	25.1
Kofod	2997	23.0	25.0	26.3	24.8
Beloglina	1544	21.0	22.3	21.7	21.7
Ghirka Winter	1438	21.3	21.3	21.3	21.3
Alberta Red	2979	18.7	21.7	21.0	20.5

Variety	C.I.No.	Yields in bushels per acre Ser.1	Ser.2.	Ser.3	Ave.
Turkey	2998	10.7	25.3	25.3	19.8
Kharkov	1442	14.3	20.0	22.7	19,0
Hyorid 128	4326	17.0	17.0	19.3	17.8
Odessa	3274	16.0	18.0	18.7	17.6
Armavir	1355	10.5	20.8	21.0	17.4
Bulgarian	2048	13.0	15.3	22.7	17.0
Crimean	1437	15.3	15.0	22.3	16.9
Goldcoin	2996	15.0	16.8	14.0	15.3
Blackhull	6251	25.7	24.3	-	25.0
Turkey	2998	25.7	23.3	-	24.5
Alberta Red	5797	22.7	23.7	-	23.2
Red Winter	1.6213	20.7	21.0	-	20.9

The last four winter wheats were not included in with the first fifteen varieties; they were grown on a separate series of plots with Turkey C.I. No. 2998 as a check.

Average yields of spring wheats full sown follow :

Variety	C.I. No.			
Little Club	4066	24.3	bushels	per acre
Marquis	4158	24.1	"	" "
Turkey	2998	24.3	"	" "
Early Baart	1697	16.5	"	" "
Kubanka	1440	5.2	"	" "

Each variety was replicated twice.

The spring wheats including the durum varieties were replicated twice; the yields follow:

Variety	C.I.No.	Ave.Yield	Variety	C.I.No.	Ave.Yield
Early Baart	1697	13.0 bu.	Little Club	4066	9.5 bu.
Sawour	2346	12.9 "	Chul	2227	9.3 "
Galgalos	2398	11.6 "	Ghirka Sp.	1517	8.9 "
Pac. Bluestem	4067	10.8 "	Dicklow	3665	8.7 "
Marquis	4158	10.3 "	Reg.Defiance	5543	6.0 "
Kooka	2203	9.7 "	Defiance	5542	6.0 "
Commander	6228	9.6 "	Whit Fea.	4981	6.0 "
Hard Federation	4733	3.5 "	Velvet Don	2247	7.3 "
Federation	4734	2.2 "	Sevier	6242	7.3 "
[illegible]	[illegible]		Arnautka	1494	7.1 "
Bashir	2087	9.1 "	Adjini	1594	7.0"
Pelies	1584	8.3 "			

The yields of winter wheats in the regular varietal experiment follow :

Variety	C.I.No.	Yields in bushels per acre Ser.1	Ser.2	Ser.3	Ave.
Kanturki	6[illegible]5	36.0	38.2	32.0	35.4
Triplet	5408	26.0	26.3	24.0	25.4
Manhardi	5149	18.7	27.0	29.7	25.1
Kofod	2907	23.0	25.0	26.3	24.8
Beloglina	1544	21.0	22.3	21.7	21.7
Ghirka Winter	1438	21.3	21.3	21.3	21.3
Alberta Red	2979	18.7	21.7	21.0	20.5

Yields in bushels per acre

Variety	C.I. No.	Ser.1	Ser.2	Ser.3	Ave.
Turkey	2998	10.7	25.3	25.3	19.8
Kharkov	1442	14.3	20.0	22.7	19.0
Wash. Hybrid 128	4326	17.0	17.0	19.3	17.8
Odessa	3274	16.0	16.0	18.7	17.6
Armavir	1355	10.5	20.8	21.0	17.4
Bulgarian	2048	13.0	15.3	22.7	17.0
Crimean	1437	13.3	15.0	22.3	16.9
Goldcoin	2996	15.0	16.8	14.0	15.3
Clarks Blackhull	6251	25.7	24.3	-	25.0
Turkey	2998	25.7	23.3	-	24.5
Alberta Red	5797	22.7	23.7	-	23.2
Red Winter	6213	21.0	20.7	-	20.9

The last four winter wheats were not included with the first fifteen varieties, but were grown on a separate series of plots with Turkey C.I. No. 2998 as a check.

Average yields of spring wheats full sown

Variety	C.I. No.	Bushels per acre
Little Club	4066	24.3
Marquis	4158	24.1
Turkey	2998	24.5
Early Baart	1697	16.5
Kubanka	1440	5.2

Each variety was replicated twice.

The spring wheats, including the durum varieties, were replicated twice;

Variety	C.I. No.	Ave. Yield	Variety	C.I.No.	Ave. Yield
Early Baart	1697	13.0 bu.	Little Club	4066	9.5 bu.
Saumur	2346	12.9 "	Caul	2227	9.3 "
Galgalos	2398	11.6 "	Ghirka Sp.	1517	8.9 "
Pec. Bluestem	4067	10.8 "	Dicklow	3663	8.7 "
Marquis	4158	10.5 "	Reg. Defiance	5543	6.0 "
Kooka	2205	9.7 "	Defiance	5542	6.0 "
Quadrat-ard	6228	9.6 "	White Federation	4981	6.0 "
Hard Federation	4753	3.5 "	Velvet Don	2247	7.5 "
Federation	4734	2.2 "	Sevier		7.3 "
			Arnautka	1494	7.1 "
Moh. Ben Bachir	2087	9.1 "	Adjani	1594	7.0 "
Pelies	1584	8.3 "			

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher)/ No report.

OREGON

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report.

Sherman Co. Branch Station, Moro (D. E. Stephens). No report.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones.) Cool weather prevailed during the entire month of September. Maximum temperature, 99 degrees on September 1; minimum temperature, 43 degrees on September 25; greatest daily range of temperature 39 degrees.

Rice is maturing rather slowly. We are draining the fertilizer, cultural, and irrigation plats today. The other plantings, except the nursery, have been drained for several days.

Some few farmers are harvesting the early rices in this section, and on the west side. There are, however, many fields that are still quite green, and some are not fully headed. It is very doubtful whether the latter will mature, however, a late favorable fall may mature them. These late fields evidently were not irrigated until some time in June, as a number of them are sown to early varieties.

Agricultural Experiment Station, Berkeley (W. W. Mackie) No. report.

Plant Introduction Station, Chico (V. H. Florell) No report.

C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations
Bureau of Plant Industry, U. S. Dept. of Agriculture.
(NOT FOR PUBLICATION.)

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Vol. 12 October 20, 1920. No. 25.
Personnel (Oct. 11-20) and Field Station (Oct. 1-15) Issue.

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PERSONNEL ITEMS

Dr.C. R. Ball, Cerealist in Charge, left Washington on October 17 to attend the annual meeting of the Association of Land Grant Colleges and the affiliated agricultural societies from October 18 to 22, inclusive, at Springfield, Mass.

Merle L. Benshoof has resigned from the barberry eradication campaign in North Dakota, effective September 30, at the conclusion of his temporary appointment.

Dr. Arthur T. Evans, formerly assistant pathologist in this office, and more recently Professor of Botany at Huron College, Huron, South Dakota, has been appointed Associate Professor of Agronomy in the South Dakota College and Associate Agronomist in the experiment station where he will devote much of his time to plant breeding.

William B.Gass who has been engaged in barberry eradication in North Dakota resigned on September 30 at the termination of his temporary appointment.

Dr. Geo. N. Hoffer, Pathologist in Charge of the Investigation of Corn Rot Diseases in Cooperation with the Indiana Experiment Station, attended the meetings of the Association of Land Grant Colleges & Affiliated Agricultural Associations at Springfield, Mass., beginning October 18, 1920.

Dr. C. E. Leighty, Agronomist in Charge of Eastern Wheat Investigations, left Washington on October 18, to attend the meetings of the Association of Land Grant Colleges & Affiliated Agricultural Associations at Springfield, Mass.

Professor R. A. Moore, Agronomist of the Wisconsin Experiment Station, who was appointed collaborator of this office several years ago in connection with environmental experiments conducted at Madison has resigned, effective September 30, on account of the completion of these experiments.

Emil H. Ostrom, has resigned from the barberry eradication campaign in Minnesota, effective October 5.

Matthew E.Tindall resigned on September 30 from the campaign for barberry eradication in Minnesota in order to resume his studies at the North Dakota Agricultural College.

Archie M. Waldie, Field Assistant in the barberry eradication campaign in North Dakota, has resigned, effective October 15, 1920, having completed the work for which he was appointed.

Dr. C. W. Warburton, Agronomist in charge of Field Experiments, who has been on leave during the week ending October 16, will attend the annual meeting of the Association of Land Grant Colleges and affiliated agricultural societies in Springfield, Massachusetts, October 18 to 22, inclusive, after which he will return to the office.

VISITORS

Professor John R. Fain, Agronomist of the Georgia State College of Agriculture, was an office visitor on October 16 to discuss the experiments conducted cooperatively at that institution and its sub-stations.

Dr. E. M. Freeman, Head of the Department of Plant Pathology in the Minnesota College and Station, and collaborator of this Office in barberry eradication and rust studies, was an office visitor for a conference on October 18.

Dr. E. J. Idings, of the Idaho Experiment Station, discussed present and future cooperation in cereal production and cereal pathology during a visit on October 15.

Mr. James R. Shelton was in conference with specialists of the Office in plant breeding especially with reference to wheat, on October 14 and 15. He holds a Farrar traveling scholarship from the University of New South Wales, Australia, has spent one year in England studying genetics at Cambridge under Professor Biffen, and will now spend a year in the United States, principally at some one of the colleges and stations specializing in plant breeding with wheat. He is accompanied by Mrs. Shelton.

Dr. W.LJ.Waterhouse, Plant Pathologist of the University of New South Wales at Sydney, discussed American problems in cereal pathology with our specialists on October 12 and 13.

PUBLICATIONS

Department Bulletin No. 869, entitled "The Inheritance of the Length of Internode in the Rachis of the Barley Spike," by Dr. H. K. Hayes and Dr. Harry V. Harlan, was received on October 16.

EMERGENCY FIELD PRINTING

WARNING - IMPORTANT

The law provides that all printing for the Department must be done at the Government Printing Office, except in extreme emergencies when certain printing for use in the field may be done by commercial plants.

When such an emergency arises in the field the matter must be taken up with this Office, by wire if sufficiently urgent, and approval of the Joint Committee on Printing secured before the printing is done.

In requesting authority for "outside" printing it must be made clear that the circumstances requiring it could not have been foreseen. It also must be shown clearly what emergency exists which makes it impracticable to have the work done at the Government Printing Office. The statement should give a full description of the work and an estimate of the cost.

When the approval of the Committee is secured the employee who has made the request will be notified from this Office. DO NOT HAVE PRINTING DONE UNTIL AUTHORITY IS GIVEN, as you may be unable to obtain reimbursement.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley, (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs). No report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). No report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). The seeding of the varietal plats of oats, barley, wheat and rye has been completed. Germination of the seed sown has been very slow, owing to the continuous dry weather. Oats sown September 29 show at present not over a 50% stand with the exception of two varieties, Fulghum and Aurora, which had the ability to penetrate the hard crust formed by the rain of September 30. Since this date no rain has fallen. The wheat which has germinated is spindly and of poor color.

Volunteer soy beans are growing rapidly in the cereal nurseries and a frost would be beneficial, especially to the oat nursery. Dr. C. E. Leighty has completed the sowing of over 2 acres of nursery wheat and rye. The sowing of the nematode disease experimental plats has been completed.

NEW YORK

Cornell University Experiment Station, Ithaca, (H.H.Love). No report.

INDIANA

Indiana Agricultural Experiment Station, LaFayette, (H.S. Jackson and E. B. Mains). The sowing of winter wheat for observation as to rust resistance has been completed at LaFayette, 192 varieties and selections having been sown in 10-foot rows, together with about 20 varieties of rye. Over 800 head rows of a number of the most promising varieties have been sown in the rust nursery in the hope that more resistant strains of these varieties may be obtained by this method. Some preliminary work has also been started on the effect of fertilizers and the date of sowing upon the severity of the rust. The dry weather of the past two weeks has rather seriously interfered with the sowing of wheat and is retarding the growth of that which is sown.

A rather extensive series of wheat sowings has been undertaken this fall. Mr. Carl Kurtzweil has put in a duplicate set of wheat varieties at Knoxville, Tenn. Besides this complete set Mr. Kurtzweil has also arranged for planting 15 to 20 of the most resistant varieties at Murfreesboro, Crossville and Jackson, Tenn. We have also received word from Prof. Dickson that he has again sown the set of 200 varieties and selections which were sown at Madison, Wis. in the fall of 1919 for observations as to leaf rust and scab. Besides the above, arrangements have been made whereby a set of from 7 to 20 of the most resistant varieties will be sown at various places throughout the country. Through the kindness of the Pathology and Agronomy departments, these will be sown at Auburn, Ala.; Athens and Tifton, Ga.; Clemson College, S. C.; West Raleigh, N.C.; Washington, D.C.; State College, Pa.; Ithaca, N.Y.; Wanatah and Bedford, Ind.; East Lansing, Mich.; Madison, Wis.; Brookings, S.Dak.; Ames, Iowa; Manhattan, Kans.; College Station, Texas; Berkeley, Cal.; and Corvallis, Ore. From these plantings it is hoped that information with reference to the distribution of the strainsgof leaf rust of wheat may be determined, together with further data on the resistance of the various varieties of wheat.

About 63 species of Ranunculaceae and Boraginaceae have been sown in a perennial garden in order that the action of the leaf rusts on these hosts may be studied under field conditions and that a supply of these various species may be assured for culture studies. The seed of a number of species of these families has been received from various foreign botanical gardens and is being sown in the greenhouse to obtain further hosts for next spring's culture work.

Several species of grasses which had died out during the summer have been replanted in the grass garden. The seed of the species which fruited during the summer has been gathered in all except a few cases and is now being thrashed. A few species which were late in flowering still remain to be gathered.

The various cultures of leaf rust on wheat, rye, barley, corn and wild grasses are now being increased in preparation for the winter's culture work. Up to date 147 collections of telia have been obtained and placed out to winter for next spring's heteroecious culture work.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington, (J. R. Holbert) No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler), A total corn yield of 227,428,000 bushels for Missouri is forecast by the State Board of Agriculture. This is an increase of 72,000,000 bushels over the yield of 1919. The crop is now practically all matured and the yield per acre will average about 35 bushels for the State. The condition of the crop improved steadily since September 1. About 15 per cent of the acreage was slightly damaged by frost in late September but weather conditions since that time have been highly favorable.

Wheat sowing has been completed all over the State. On the Station field we sowed wheat on October 6, 7 and 8. The sowing included about 40 fiftieth-acre plats, 3,750 rod rows, and 1,000 head rows of wheat. The complete series of the Ball and Clark classification material was sown for comparison with the varieties grown in the rod-row tests. We hope this year to complete the reclassification of our varieties begun last year.

The comparative yields of spring-sown grains, oats, barley, wheat and rye at Columbia are shown in the data below. The varieties were grown in plats 96 x 6 feet repeated three times. The yield given in each case is the average yield of the three plats in bushels per acre on the basis of 32 pounds per bushel for oats, 48 pounds per bushel for barley and 60 pounds per bushel for wheat and rye.

Oats

Variety	Yield per Acre
Swedish Select	24.13
White Bohemian	30.67
American Banner	25.17
Early Champion	33.06
Iowa No. 105	31.60
Fulghum	33.55
Kherson	31.95
Red Rustproof	31.18
Burt	35.90
Silvermine	29.03
Nebraska No. 21	38.69

Barley

Variety	Yield per acre
White Hulless	7.54
Black Hulless	9.41

Wheat

Marquis	6.21
Scotch Fife	2.28

Common Rye

Common Rye	11.40

The college term opened September 1. About 150 students are registered in our general course this term. In addition to the general course we are giving courses in Forage Crops, Fiber Crops, Grain Grading and Marketing, and

Special Problems. Four graduate students are majoring in the department. The staff of the Department of Field Crops includes eight men of whom one devotes his time exclusively to teaching, five to teaching and investigation, and two to extension work. Another extension man will be added shortly.

GREAT PLAINS [illegible]

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger). Thus far October has been dry and cool and there have been several severe windy periods. Work on the Cereal project has consisted of harvesting the remaining date-of-seeding plats, harvesting and selecting seed heads from the broomcorn nursery and preparing for thrashing the sorghum plats.

Increase fields of Dwarf Milo and several strains of broomcorn have been harvested. These and the Sunrise and Dawn kafir fields should yield a good quantity of seed for the coming year.

Quite an acreage of wheat has been sown and is up to good stands, while some farmers have not yet sown their wheat. The sorghums are being harvested as rapidly as possible, a large percentage being harvested by row binders. Broomcorn is being brought to town.

The minimum temperature for this month to date was 38° on October 1.

KANSAS

State Experiment Station, Manhattan (John H. Parker). No report.

Fort Hays Branch Station, Hays (A. F. Swanson). The first two weeks of October have been dry, so that the surface soil is not in the best condition for seeding wheat. However, most of the farmers have finished seeding. Early seeding was benefited by a rain late in September.

The varietal sorghums were thrashed from October 5 to 8. The yields were somewhat higher than expected. Dawn kafir will be one of the leading sorghums as to yield, running about 45 bushels per acre. The early rate of seeding (May 20) of both Kafir and Milo gave the highest yields.

Practically all of the field work for the 1920 crop is now completed and the data taken preparatory to writing the annual report.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). The weather conditions during the first half of October were very favorable for fall work but unfavorable for fall-sown grain. The weather was warm and dry. The only precipitation worth mentioning occurred October 14th, when 0.27 inch of rain fell.

Fieldwork on Akron Field Station is nearly finished. About the only field work yet to be completed is corn husking. This will be a larger job than usual as the corn crop is especially large here this season.

Threshing of sorghums was completed October 16. The yields were very poor due to hail damaging the crop.

The seeding of Cereal plats was completed October 16. Due to the dryness of the soil all seedings of wheat sown since September have emerged rather unevenly. It is very likely that the rain of October 14 will be of great benefit in germinating the wheat in this section as most of the wheat has been sown

since September 5.

Seeding of the C. I. nursery is practically completed. The fall nursery this season covers about two-thirds of an acre and will contain about 1,000 rows.

WYOMING

Cheyenne Experiment Farm, Cheyenne (A. L. Nelson). No report.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzell). No report.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.) The first half of October has been very mild with no rain except a very little the first day of the month and no frost.

All flax has been harvested except a few late rows that are not ripe yet. Volunteer flax, seeded by hoppers snipping off the bolls from the flax just before harvest, is beginning to bloom.

The winter wheat sown August 30 has continued to make good growth.

Lt. Col. Birch, British D. S. O., Manager and Director of the Mosul Farms in Mesopotamia, visited the Station October 10 and 11. Among other things he was interested in wheat varieties for an arid climate, and gave interesting information on wheat varieties grown in Mesopotamia. Of the wheat varieties grown here Marquis seemed most closely to resemble the rust susceptible bread wheat Kandahari grown in Mesopotamia. The Kubanka grown in the rotations here is similar to their Ruchghoul and Thurghoul. They have also begun to grow a bread wheat imported from Punjab which is rust resistant.

Maximum temperature for the first half of October was 91°, recorded October 7 and 8; minimum, 34° recorded October 9, 15 and 16; precipitation, 0.07 inch, recorded October 2.

Dickinson Substation, Dickinson (Ralph W. Smith). During the first half of October the weather has been favorable for thrashing and most of this work in the vicinity of the Substation is completed. In general the yields are fairly good except late-sown wheat, which was injured more or less by the rust. All thrashing at the Substation was completed with the completion of the nursery thrashing last week.

There has been very little precipitation this month, but the rain occurring the last week in September has insured the germination of practically all winter grain sown up to this time. Winter rye at the Substation and in the vicinity is in fairly good condition. Good stands of winter wheat were obtained in both nursery and varietal plats. Stand notes have been taken and the cleaning of seed grain is in progress.

Some fall plowing has been done by the farmers and more will be done as the thrashing operations draw to a close. Another good rain would leave the ground in better condition for plowing.

Last week the Substation was visited by Director Trowbridge, accompanied

by Hon. Mr. Hamilton, Minister of Agriculture for Saskatchewan, and Pres. John Bracken of Manitoba Agricultural College.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). All of the winter wheat on the Experiment Farm except the nursery has emerged, but has been making very slow growth on account of the dry condition of the soil. A good rain which fell during the week will perhaps enable the wheat to make a good growth before winter sets in.

The work with winter wheat under the Cereal Project consists of 195 plats and about 1/3 acre of nursery. Of the 195 plats, 52 are in the type-of-drill straw-mulching experiment, 70 in the type-of drill rate-and-direction-of-seeding experiment; 20 in the harrowing experiment; and 53 in the varietal tests. The nursery consists of 636 rod rows, 71 head rows, and 15 eight-rod rows.

The spring cereal nursery and some rogued out material is under shelter but has not been thrashed. As soon as the rogued out material has been thrashed and credited to the proper plats preliminary reports of grain yields will be available.

Thrashing is about finished in the Judith Basin and many farmers are stubbling in their winter wheat. Farmers are receiving around $1.68 per bushel for wheat at present.

Our lowest temperature thus far recorded was 24°, October 15. Our previous low temperature was 29° in the latter part of September.

WESTERN BASIN AND COAST AREAS
(South to North and West)

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). No report.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No report

Sherman Co. Branch Station, Moro (D. E. Stephens). No report.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No report.

Agricultural Experiment Station, Berkeley (W. W. Mackie). No report.

Plant Introduction Station, Chico (V. H. Florell). The summer's drought for the season was broken during the last part of the week ending October 10 by a precipitation of a little over 1 inch. Some commercial fields of wheat had

been sown previous to this rain on the heavy adobe lands. This moisture is especially welcome to wheat and barley growers as it will enable them to begin plowing and preparing their fields for the coming crop. Rice men have been considerably worried on account of the unfavorable weather for ripening and harvesting operations. However, the weather is fair again and seems to be settled for a while.

The land for cereals at the Gardens is being harrowed and disked in preparation for the coming season. The seed bed will be in good condition for sowing this year.

The first date-of-seeding series of cereals (wheat, barley, oats and flax) was sown yesterday.

C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture.
(NOT FOR PUBLICATION)

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Vol. 12 OCTOBER 30, 1920 No. 26
Personnel (Oct. 21-30) and Project Issue.

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DATE OF ISSUE OF CEREAL COURIER.

Beginning with the next issue, the Cereal Courier will be issued semi-monthly on the 1st and 16th of each month until April 1, 1921. On that date, issuance on the 10th, 20th, and end of the month will be resumed.

PERSONNEL ITEMS

Dr. Carleton R. Ball, Cerealist in Charge, returned to the Office, October 25 from Springfield, Mass., where he attended the meetings of the American Society of Agronomy and the Association of Land -Grant Colleges.

Donald Brazie, field assistant in the barberry eradication campaign in Iowa, resigned September 15.

Raymond Bulger, field assistant in the barberry eradication campaign in South Dakota, has completed the work to which he was assigned and his appointment was terminated on September 30.

Paul J. Byrd, field assistant in the barberry eradication campaign in South Dakota, completed the work assigned to him on September 7, and his appointment was terminated on that date.

LeRoy F. Catterson, field assistant in the barberry eradication campaign in Iowa, completed the work assigned to him on September 30, and his appointment was terminated on that date.

Grant Cook, field assistant in the barberry eradication campaign in Wisconsin, completed the work assigned to him on October 2, and his appointment was then terminated.

Miss Nina G. Cook, stenographer and typewriter at the East Lansing, Michigan, office of the barberry eradication campaign, completed the work assigned to her on October 9, and her appointment was then terminated.

Ralph E. Curtis, field assistant in the barberry eradication campaign in Illinois, completed the work assigned to him on September 30, and his appointment was terminated on that date.

S. M. Dietz, assistant pathologist in crown rust investigations of oats in cooperation with the Iowa Agricultural Experiment Station, has resigned, effective October 15, to pursue post-graduate study at Cornell University.

Dr. H. B. Humphrey left Washington October 27 for conferences at LaFayette, Ind., and Bloomington, Ill., on the root, stalk, and ear rot diseases of corn, and to confer with experiment station officials at Madison, Wis., and St. Paul, Minn. He expects to return to Washington about November 7.

Lyman D. Hutton, field assistant in the barberry eradication campaign in South Dakota, resigned October 31, the work for which he was appointed having been completed for the season.

Dr. F. E. Kempton left Washington October 28 for an inspection trip to the barberry eradication area.

William A. Kurtz, field assistant in the barberry eradication campaign in South Dakota, completed the work assigned to him September 30, and his appointment has been terminated.

Dr. Clyde E. Leighty returned to the Office October 23 from Springfield, Mass., where he attended the annual meetings of the American Society of Agronomy and the Association of Land-Grant Colleges.

Hugh N. Trowbridge, field assistant in the barberry eradication campaign in North Dakota, resigned October 28 on the completion of field work for the season.

C. W. Warburton returned to the Office October 25 following attendance at the annual meetings of the American Society of Agronomy and the Association of Land-Grant Colleges.

VISITORS

F. D. Farrell, director of the Kansas Agricultural Experiment Station, was an Office visitor October 26 and 27.

Senor Vallejo, commercial attache of the Argentine embassy, was an Office visitor October 29.

PUBLICATIONS

A paper entitled "The Effect of Citric Acid on the Germination of the Teliospores of Puccinia graminis tritici," by A. F. Thiel and Freeman Weiss, was published in the October issue of Phytopathology, v. 10, no. 10, p. 439-452.

PROJECT REPORTS

218. CEREAL DISEASE INVESTIGATIONS.

(Dr. H. B. Humphrey, Pathologist in Charge.)

218-B. RUST INVESTIGATIONS.

(Dr. H. B. Humphrey, Pathologist in Charge.)

BARBERRY ERADICATION CAMPAIGN.

(Dr. F. E. Kempton, Pathologist in Charge.)

COLORADO: Agricultural College, Fort Collins (John R. Fitzsimmons). During the month of October little work has been done in the field. Most of the time has been spent in the preparation of mounted life cycle cards to be used as demonstration charts in districts where many bushes were found growing wild last summer.

Some original and resurvey work was done in Denver, Larimer, and Boulder counties. The result of this work was the finding of two more plantings of common barberry bushes containing 31 bushes. Four other plantings containing 89 bushes were removed. This brings the State totals to 1,513 plantings found and 1,501 plantings removed, 21,642 bushes found and 21,170 bushes removed. We are at present endeavoring to have the remaining bushes dug through the efforts of the State Entomologist's office.

ILLINOIS: State Entomology Building, Urbana (P. A. Glenn). No report.

INDIANA: Purdue University Agricultural Experiment Station, Lafayette (R. J. Hosmer). No report.

IOWA: Iowa State College, Ames (R. H. Porter). No report.

MICHIGAN: Michigan Agricultural College, East Lansing (W. F. Reddy). No report.

MINNESOTA: College of Agriculture, University Farm, St. Paul (Leonard W. Melander). No report.

MONTANA: State College of Agriculture and Mechanic Arts, Bozeman (H. E. Morris). No report.

NEBRASKA: College of Agriculture of the University of Nebraska, Lincoln (James A. Harris). Fall rains have interfered with the progress of the rural scouting during a part of the month. A total of 491 bushes was located, 385 of which were removed. In the follow up work 789 bushes were found sprouting and the sprouts were dug by the field men.

The largest hedge found in the State to date was located in Saline County. While this hedge was not as long as the mile hedge found at Hartington early in the campaign the bushes were fully 20 feet in height. The hedge had been planted by one of the earliest settlers in the State and the larger branches had never been cut off so, as a whole, it had the appearance of the osage orange hedges common in this part of the State.

Much interest is being shown by the experiment station workers in the rust situation on the winter wheat. The earliest sowings have considerable rust on the first few leaves formed but the new leaves are free from stem rust pustules.

A total of 1,177 bushes was removed during the month. Of these, 789 had been cut off previously and were sprouting. The remaining 388 were new locations.

NORTH DAKOTA: Agricultural College, Agricultural College (George C. Mayoue). Exceptionally good weather for this time of the year in North Dakota has made it possible to continue the field work without any loss of time. Because of very little fall rain, the roads are in excellent condition.

On September 30, six of the eight field assistants who were originally appointed resigned. The two remaining assistants had their appointments extended one month. One of these men resigned October 16 and the other October 26.

The farm-to-farm survey by auto was made in Dickey, LaMoure, and Cass counties during October. The State Leader and three temporary assistants, who were hired by the day for a few days each, checked the plantings which had been reported to the Office and surveyed plantings at the request of owners.

Twenty-one plantings have been reported to this Office by mail since April 1, 1920. In all cases the owners were asked to submit a sample of the bushes, after which they were instructed to destroy the plantings. To ascertain whether or not the bushes reported have been completely eradicated, a check on those plantings, as well as all plantings previously found, will be made.

Five plantings of barberry on farms, totaling 38 bushes, were located and destroyed by the field assistants working in Dickey County. Four plantings, containing 13 bushes, which were reported through the mail, were checked Two bushes and four sprouts were found. One of the plantings was very poorly eradicated, most of the roots having been left in the ground. In one case, the planting was merely cut down.

A man was sent to Esmond, N. Dak., on request, to identify different hedges and to act as supervisor in the scouting of the town and township. This man found a hedge of 78 purple-leaf barberries.

A total of 129 bushes were located during the month in original survey work. A resurvey of all the towns in the territory which was scouted from farm to farm was made.

OHIO: College of Agriculture of Ohio State University, Columbus (John W. Baringer). Last season was not a bad stem rust year in Ohio, judging from information collected by field assistants. It was not difficult to find a small amount of stem rust on wheat and oats in various sections of the State. However, instances in which serious economic damage resulted, from local epidemics were comparatively few. Residents of three rural neighborhoods in western Ohio registered complaints of loss due to local black stem rust attacks. Investigations in each of the three cases disclosed the presence of infected barberries. Whenever rusted barberries are found near rusted grain fields very little persuasion is necessary to accomplish our aim.

In the course of the past summer six instances were noted in which barberries had escaped from cultivation. All escaped locations were in the rural districts and all were rusted. It was very evident that the barberries, in two of the cases just mentioned, had been indirectly, responsible for the partial destruction of grain crops for a period of several years. Damage from rust attacks in those localities diminished considerably this year, the responsible barberries having been exterminated.

The farm-to-farm barberry survey of Darke and Mercer counties was completed in October. Six counties of Ohio have been entirely covered, to date, by the rural survey. The counties finished are Greene, Montgomery, Preble, Darke, Mercer, and Van Wert. The work has recently been started in Paulding and Defiance counties. Plans are being made to continue our efforts along this line as long as weather conditions permit.

SOUTH DAKOTA: College of Agriculture, Brookings (H. C. Gilbert). The farm survey work was continued during October. Very good weather has prevailed during the month. Our field force was reduced to four by some of the men returning to college in September. Lincoln County and parts of Moody and Minnehaha counties have been completed. About seventeen farm plantings consisting of 5,100 bushes have been located. A large number of these were seedlings or wild bushes. Three town plantings of 19 bushes were found.

WISCONSIN: College of Agriculture of the University of Wisconsin, Madison (Noel F. Thompson). No report.

WYOMING: College of Agriculture, University of Wyoming, Laramie (Ralph U. Cotter). No report.

218-D. SMUT INVESTIGATIONS.

(Dr. George M. Reed, Pathologist in Charge.)

OAT SMUT INVESTIGATIONS.

(George M. Reed and Marion Griffiths.)

During the past season, oat smut nurseries were sown at Columbia, Mo.; Ames, Iowa; Manhattan, Kans.; Aberdeen, Idaho; and Pullman, Wn. Approximately 95 varieties, belonging to seven species of Avena, were used. In several cases, more than one strain of a particular variety was sown, so that the total number of strains at the different places varied from 125 to more than 150.

Both loose and covered smuts were used at all of the stations except Pullman, where only covered smut was employed. At each station one or more rod rows of inoculated seed were sown, with check rows of uninoculated seed. The general scheme was to have the plats arranged parallel to each other, the check plat being in the middle. In several cases, a small amount of smut occurred in the check rows. For the most part, this smut was found in varieties or strains that were used for the first time this season.

Comparatively low percentages of infection were obtained at Columbia, Mo. This was no doubt in large part due to the fact that the sowing was made very late. Usually, the plats are put in the latter part of March. This year, on account of the late, backward spring, they were not sown until after May 1.

In general, a lower percentage of infection was obtained at Ames than at the other three stations - Manhattan, Aberdeen, and Pullman. For the most part, the highest percentages of infection were obtained at Aberdeen. In individual cases, however, higher percentages were obtained at other points.

As in previous work, a large number of varieties proved very susceptible to both smuts. This was particularly true of all strains and varieties of Avena nuda, Avena fatua, and Avena sativa orientalis. A considerable number of varieties of Avena sativa also gave high percentages with both smuts, such as Awnless Probsteier, Canadian, Early Champion, Eclipse, Golden Rain, Green Russian, Tobolsk, and Victor. A few varieties of this species gave a low percentage of infection with covered smut and a comparatively high percentage with the loose smut. The following may be mentioned: Aurora, Culberson, Joanette, Rossman, and A. S. trisperma. A few, such as A. s. aurea, Golden Rustproof, Nebraska No. 21, and Scottish Chief were either very slightly infected or not at all.

The varieties that have shown a high degree of resistance in the earlier work also proved to be resistant in the tests made this year. All of the varieties of Avena sterilis proved very resistant. Avena sativa, varieties nigra and Black Mesdag, have again shown remarkable resistance, as have Avena previs and Avena strigosa. In a few cases at one or more stations, a variety which in the past has proved free from smut appeared to be infected this year. In many of these cases, however, the infection of the particular variety is doubtful. It is probable that the infected plants were stray individuals of some other variety in the row.

In general, most varieties behaved similarly to both species of smut. To some extent, the percentage of infection was lower with the covered smut than with the loose smut. A considerable number of varieties which were infected more or less with the loose smut proved entirely free from the covered smut. As most of these have been used for the first time this season, additional tests will be necessary to determine whether there is any real difference in their behavior to the two smuts.

A few hybrids between Fulghum and Swedish Select were tested with reference to their behavior to Nattan-80 avenae. In 1919, the F_3 generation of the crosses was grown at Aberdeen. In 1920, the F_4 generation from a few rows which gave either no smut or high percentages of smut in 1919 was grown. The plants in each row were the progeny of a single F_3 plant. Six selections from each of ten rows were sown. In 1919, three of these ten gave high percentages of infection. All of the six selections of each in 1920 gave high percentages of infection. The remaining seven gave entirely negative results in 1919. In 1920, only a trace of infection occurred in most of the selections, although in a few it amounted to 6 to 18 per cent.

Tests were made to determine the value of Seed Protecto as a preventive of oat smut. Mr. R. W. Smith seeded plats at Dickinson, N. Dak., and Mr. R. W. May seeded similar plats at Moccasin, Mont. The variety Sixty-Day was heavily inoculated and divided into three lots. One of each was treated with Seed Protecto, a second with formaldehyde, using the sprinkling method, and the third lot was sown untreated as a check. A set of each treatment was forwarded to Dickinson and sown in sixtieth-acre plats and the other set was forwarded to Moccasin and sown in fiftieth-acre plats. At both stations duplicate seedings were made. The results were as follows:-

Treatment	Dickinson, N. Dak.		Moccasin, Mont.	
	Per cent smut	Yield, bu. per acre.	Per cent smut	Yield, bu. per acre.
None	5	59.8	5.6	24.2
Seed Protecto	3	57.8	6.4	28.1
Formaldehyde	t	73.7	t	32.8

At Dickinson there was a noticeably poorer stand of plants in the plats sown with seed treated with Seed Protecto. Mr. Smith has suggested that the Seed Protecto left the surface of the seed sticky, thus allowing it to run through the drill more slowly.

The treated seed showed a germination of 90 per cent. This indicates that the seed was not particularly injured by the treatment and the results also indicate that the smut spores did not suffer seriously from the application of this chemical.

C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations
Bureau of Plant Industry, U. S. Dept. of Agriculture.
(NOT FOR PUBLICATION)

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Vol. 12 November 15, 1920 No. 27
Personnel (Nov. 1-15) and Field Station (Oct. 16-Nov. 15) Issue.

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PERSONNEL ITEMS

L. C. Aicher superintendent of the Aberdeen, Idaho, Substation, arrived in Washington November 11 to consult with project leaders and to prepare his annual report of cereal investigations on the Aberdeen Substation. While en route to Washington he stopped at Manhattan, Kans., to consult with agronomists of the Kansas Agricultural Experiment Station.

Dr. Carleton R. Ball, cerealist in charge, left Washington November 7 for Berkeley, Biggs, and Chico, Cal., to consult with experiment station officials and employees of the Office with regard to the conduct of future investigations in that State. En route to California he stopped at Manhattan, Kans., Woodward, Okla., and Lubbock, Texas, to consult with experiment station officials and inspect cooperative experiments. While at Manhattan he addressed members of the Tri-K Club, an informal organization of faculty and students in agronomy at the Kansas State Agricultural College.

J. C. Brinsmade, jr., arrived in Washington November 15 from the Northern Great Plains Field Station, Mandan, N. Dak., where he has conducted experiments with flax during the past several months.

James A. Faris, assistant pathologist in charge of the barberry eradication campaign in Nebraska, has resigned effective November 15. Mr. Faris has accepted a position at the Government Experiment Station of Santo Domingo, Haina, Dominican Republic, at a much increased salary.

John R. Fitzsimmons has been appointed collaborator, by change of appointment from field assistant, effective December 1. Mr. Fitzsimmons will take a course at the Colorado Agricultural College this winter and will act as State Leader of the Barberry Eradication campaign in Colorado.

Miss Agnes U. Haasl, stenographer and typist for Dr. E. C. Stakman in connection with cooperative investigations of cereal rusts at the Minnesota Agricultural Experiment Station, University Farm, St.Paul, Minn., resigned October 30 to accept a commercial position at Lemmon, S. Dak.

John F. Holmes, field assistant in the barberry eradication campaign in Indiana, resigned November 9 on completion of field work for the year.

Dr. H. B. Humphrey returned to Washington November 7. During his absence he attended a conference on sweet-corn problems at La Fayette, Ind., where on October 29 several growers and canners of sweet corn met with Federal and State cereal pathologists to consider important questions affecting the production of seed corn and the improvement of canned products. Dr. Humphrey also visited Madison, Wis., and St.Paul, Minn., and consulted with pathologists and experiment station officials relative to experimental results obtained during the past season and plans affecting future research in the investigation of the root, stalk, and ear rots of corn, wheat scab, and stem rust. Following his visit at the University Farm, St.Paul, he proceeded to Bloomington, Ill., and La Fayette, Ind., for further conference with Mr. Holbert, Professor Hoffer, and others.

Carl Kurtzweil, who has been in charge of cooperative experiments with cereal diseases at the Tennessee Agricultural Experiment Station during the past two years, has resigned, effective November 28, to accept a position with the De Graff Canning Company at De Graff, Ohio.

Walter G. Parish, field assistant in the barberry eradication campaign in South Dakota, resigned November 12 on the completion of field work for the year.

Fred D. Richey left Washington November 8 for Burdette, Ark., and La Salle, Ill., to complete records on field experiments with corn at those points and to prepare experimental corn for shipment to Washington.

Harry P. Rigdon, field assistant in the barberry eradication campaign in Nebraska, completed the work assigned to him on September 27, and his appointment was terminated on that date.

Miss Clara B. Snyder has been appointed stenographer and typewriter on half time to assist in the barberry eradication campaign in Nebraska, with headquarters at University Farm, Lincoln. The other half of Miss Snyder's time will be utilized by the extension division of the Nebraska College of Agriculture.

D. E. Stephens, superintendent of the Sherman County Branch Station, Moro, Oregon, arrived in Washington November 12 to consult with crop specialists and to prepare a manuscript for publication presenting experimental data obtained at Moro in recent years.

A. F. Swanson, who is at present assisting the Office of Farm Management and Farm Economics in a survey to determine the cost of producing winter wheat in the hard red winter wheat belt, writes that the field party with which he is working was at Beatrice, Nebr., from October 25 to October 30 and at Clay Center, Nebr., the week of November 1 to 6.

Henry C. Stoll, field assistant in the barberry eradication campaign in Wisconsin, resigned September 11 on the completion of his field work for the year.

Miss Olive F. Tenney has been appointed stenographer and typist, effective November 16, to assist in cooperative experiments with cereals at the Kansas Agricultural Experiment Station, Manhattan, Kans.

VISITORS

Senor Marcelino Lontok, a Philippine attorney-at-law temporarily residing in Washington, called at the Office November 8 to obtain information concerning rice diseases and their control.

PUBLICATIONS

A paper entitled "Relative Yields from Broken and Entire Kernels of Seed Corn", by Ernest B. Brown, was printed in the September-October number of the Journal of the American Society of Agronomy, vol. 12, no. 6 - 7, p.196-197, 1920.

A paper entitled "Fusarium-Blight (Scab) of Wheat and Other Cereals." by Dimitr Atanasoff, appeared in the Journal of Agricultural Research, vol. 20, no. 1, p. 1-32, pls. 4, figs, 2, October 1, 1920. This is a contribution from the Wisconsin Agricultural Experiment Station, in cooperation with the Office of Cereal Investigations.

Department Bulletin 878, "Varietal Experiments with Spring Wheats on the Northern Great Plains," by J. Allen Clark, John H. Martin, and Ralph W. Smith was received from the printer November 10.

A reprint of Farmers' Bulletin 749, "Grains for the Montana Dry Lands," by Noble C. Donaldson has been received from the printer.

A paper entitled "Smooth-Awned Barleys," by Dr. Harry V. Harlan, was printed in the September-October number of the Journal of the American Society of Agronomy, vol. 12, no. 6 - 7 p. 205-208, 1920.

A new edition of 50,000 copies of Farmers' Bulletin 1175, "Better Seed Corn " by C. P. Hartley, was received from the printer November 8.

Farmers' Bulletin 1149, "Growing Corn in the Southeastern States " by C. H. Kyle, was received from the printer November 2.

Farmers' Bulletin 1162, "Proso, or Hog Millet." by John H. Martin, was received from the printer November 10.

A paper entitled "The Inequality of Reciprocal Corn Crosses," by Frederick D. Richey, was printed in the September-October number of the Journal of the American Society of Agronomy, vol. 12, no. 6 - 7, p. 185-196, 1920.

Farmers' Bulletin 1137 "Grain Sorghums: How to Grow Them" by Benton E. Rutledge, was received from the printer November 4.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (R. R. Childs) No Report

TENNESSEE:

State Experiment Station, Knoxville, and Substations (C. Kurtzweil) No Report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). (November 1) The dry spell of October was broken the 26th, when a rainfall of 0.36 inch was recorded. This was the first precipitation of any value since September 30. Wheat seeded October 6 is still germinating, but at present the stand is not over 60 percent. The barley and oat plats are filling out well and the rye plats have a perfect stand.

The last seeding in the rate-date-and-soil-preparation experiment was completed October 30. Under the direction of Dr. G. M. Reed two plats each of winter emmer inoculated with smut and treated with formaldehyde and "Seed Protect" as well as an untreated check were sown October 30. This practically completes the seeding of the fall cereals.

The first frost of the season occurred October 30, when the thermometer registered 29°. This was not severe enough to kill the volunteer soy beans which are crowding the cereal seedlings. The maximum temperature for the last two weeks of October was 84°.

(November 15) The seeding of the cereal crops for the present season at Arlington was completed November 1. This last seeding consisted of a test in fertilizer-more plats of seed treated with electricity.

Weather conditions for the past two weeks have been more favorable to the fall cereals. The aphid infestation of the wheat is disappearing and the stooling of the plant is filling in the bare spaces in the plats due to poor germination.

The rainfall for the first half of November was 0.37. A minimum temperature of 14.5° was recorded on November 14.

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love) No Report.

INDIANA

Indiana Agricultural Experiment Station, La Fayette (H. S. Jackson and E. B. Mains).(Nov. 11) During the last three weeks the leaf rust has developed rapidly upon winter wheats, spreading from early sown wheat to the wheat varieties in the nursery. The leaf rust of rye has also developed to a considerable extent and a number of fields of early sown rye are now heavily infected. This should afford a very favorable start for the overwintering of these two leaf rusts if the winter is favorable. On the other hand, although stem rust in the cereal nursery during October had developed fairly heavily upon early sown wheat, at the present time it is decreasing.

Culture work in the greenhouse is now being given more attention and a number of cultures of the leaf rust of wheat are being tested upon a selected set of wheat varieties in continuation of the investigations of strains in this rust. Further investigations upon the heteroecism of the leaf rust of rye are being made. A number of cultures of the leaf rusts of wild grasses are being increased in preparation for work late in the winter and a number of grasses have been sown in the greenhouse for this purpose.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J. R. Holbert). No report.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson) No Report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No Report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler) (November 1) The weather in Missouri during the latter half of September has been quite mild until the last three or four days, which have been decidedly cool. We are now determining the yields in our corn varietal experiments on the outlying fields over the State as rapidly as possible. The yields of corn varieties at Kennett, in southeastern Missouri, this season were as follows:

Variety	Yield ear corn, bu.	Shelling percent	Moisture Content percent
Eureka Ensilage	29.1	86.4	11.6
St. Charles Yellow	25.1	84.0	11.6
Commercial White	23.9	76.1	11.0
Bagg's 7-ear	21.9	84.0	12.0
St. Charles White	20.2	84.8	11.2
Reid Yellow Dent	20.0	84.7	11.6
Boone County White	19.7	81.0	11.8

These varieties were grown in duplicated plats 81 x 505 feet each

The yields of corn varieties at Maryville in northwestern Missouri are shown in the following table. Moisture determinations on these varieties have not yet been made.

Variety	Yield ear corn, bu.
Leaming	60.3
Commercial White	59.7
Iowa Silvermine	59.7
St.Charles Yellow	58.2
Reid Yellow Dent	58.0
Boone County White	57.6
St.Charles White	54.4
Calico	50.1

The results of corn varietal experiments at stations on out-lying fields and in the cooperative experiments have been summarized, and will be published shortly in bulletin form. We are also preparing bulletins on the wheat, oats, and barley varieties which will be published before next spring.

GREAT PLAINS AREA (South to North)

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger).(October 30) Thus far this fall we have had no killing frost here, though the temperature fell to 33° on both the 28th and 29th. On October 20 to 22 inclusive we had rains which helped wheat that had been sown and also wet up the shocked sorghums to quite an extent.

All the sorghum and broom-corn plats are harvested, and 19 plats of rate-of-seeding and date-of-seeding kafir were hauled into the barn and are being headed preparatory to threshing. Should the weather continue dry it is possible that we will get the grain sorghum plats threshed within 10 days or two weeks.

The broomcorn from the date-of-seeding experiment was weighed and the following yields obtained:

Pounds of brush per acre

Date Seeded	Good	Poor	Total
April 15	561.0	77.5	638.5
May 1	535.5	42.5	578.0
May 17	416.5	58.5	475.0
June 1	833.5	50.0	883.5
June 15	833.5	58.0	891.5
July 1	756.0	119.0	875.0

The third date-of-seeding gave the poorest yields of any of the dates. As practically all of the broom corn varietal and rate plats were seeded on this date poor yields were obtained on most of them. From our date-of-seeding results, the middle of May is a poor time to seed broom corn in this section. It seems advisable to delay seeding the varietal and rate-of-seeding plats of broom corn until some time in June in the future.

The rainfall for October has been ; Oct. 20, 0.70 in.; Oct. 21, 0.10 in.; Oct. 22, 1.29 in.; total, 2.09 inches.

(Nov. 15) Thus far November has been cold for this section. For one period of two days the temperature was not w 30°. There was a short period of rainy and cloudy weather which interrupted with threshing for two days.

Dr. C. R. Ball visited the Station for a short time on the afternoon of November 10, arriving about 4:00 P.M. and leaving on the next train, about midnight.

Threshing, fanning, and weighing of the grain from the Cereal Project should be completed this week. The indications are for high yields of most varieties of sorghums this season.

The precipitation for this month to date was 0.91 inches. The minimum temperature was 20° on both November 12 and 13.

KANSAS

State Experiment Station, Manhattan (John H. Parker) No Report.

Fort Hays Branch Station, Hays (A. F. Swanson). (Nov. 14) Since October 20, 4.30 inches of rain have fallen at Hays and a sufficient amount throughout western Kansas to break a serious drought which threatened the 1941 wheat crop. Since that time the weather has been cold with alternate thawing and freezing days.

The sowing of winter wheat in the rate-and-date-of-seeding experiment was completed October 27. All the wheat seeded previous to October 6 is in excellent condition to go into winter, having stooled and spread over the ground sufficiently to be protected from freezing. Wheat seeded after October 6 has made little growth and there is danger that this may later be injured by soil blowing.

Straw was applied to the top-dressing experiment yesterday. Very little field work now remains to be done except to roughen some ground that is subject to soil blowing.

Since October 10 the writer has been assigned to the Office of Farm Management and Farm Economics to help in a survey for the purpose of finding the cost of producing winter wheat, except for the last few days when he has been at Hays finishing some special work.

[illegible] observations while making the survey through the states of Missouri, Nebraska, and western Kansas is that wheat in the different counties is in good condition to go through the winter with plenty of moisture available. There is a great deal of volunteer wheat in western Kansas, but in some fields the stand is entirely too thick and it will be necessary to pasture heavily or kill some of the growth in some other way.

Many farmers in the vicinity of Beatrice and Clay Center, Nebr., complained of severe losses from black stem rust. In some cases it was stated that harvested yields were reduced to 10 bushels. Considerable Kanred wheat was seen for the first time last year in these localities. Some good harvest yields were reported this year, the variety proving more winter hardy and less susceptible to rust than the local wheat. Several farmers reported a favorable increase in yield where a light top dressing of straw had been made. A few farmers claimed that harrowing the wheat fields early in the spring has made them a substantial increase in yield.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). (Oct. 31) Weather conditions at Akron during the latter half of October were very favorable for fall work. No precipitations of any consequence fell during the period until October 31. On that date a snow storm occurred, totaling about 3 inches of snow.

Fall wheat in northeastern Colorado made no improvement between October 15 and October 31. Due to the almost continuous dry weather we have experienced since early in September, the fall wheat prospects were possibly actually reduced during the latter half of October. Wheat sown prior to September 10 is generally in good condition. That sown since that date is very spotted and uneven in stand, where any considerable amount of germination has taken place. In many fields sown the latter part of September or during October, very little of the seed had germinated on October 31. It is hoped that the snow of October 31 will furnish sufficient moisture to germinate this late-sown wheat.

Corn husking is well under way in northeastern Colorado. This year's crop is unusually good in this section. Many fields are yielding as much as 40 bushels to the acre, and reports of fields yielding from 45 to 60 bushels to the acre are heard. Some damage resulted to the corn from the hail storms of early September, but the damage was not as great as was at first believed.

Work on Akron Field Station has progressed more rapidly than usual this fall. Most of the experimental plats of corn on the Station have been husked. As a whole the corn yields are exceptionally high this season. Most of the plats have yielded between 35 and 40 bushels to the acre, while a few plats have yielded well over 50 bushels.

Following are the yield data from a varietal selection experiment of spring barley, grown in single fiftieth-acre plats, on ground cropped to potatoes in 1919:

Variety	C. I. No.	Yield in bus.
Blackhull	878-4-2	23.4
Arlington Awnless	704-4-1	21.2
Hannchen	531-2-09	45.0
Hannchen	602	42.2
W. Smyrna	658-1-2	44.2
W. Smyrna	658-1-10	35.1
Horsford	877-4-1	32.9
Nepal	595-1-18	33.3
Gatami	575	25.5

All plats in the experiment were sown March 30. The rate of seeding was 4 pecks per acre.

Following are the yield data in bushels per acre from a varietal experiment with spring barley, grown in four replicate fiftieth-acre plats, two on fallow and two on corn land.

Group and variety	C. I. No.	Fallo plats average	Corn land plats average	Average for variety
Two-row hulled				
Orel	351	38.8	36.2	37.5
Hannchen	602	29.3	27.8	28.5
White Smyrna	195	25.2	29.1	26.1
Blackhull	878	15.0	14.0	14.5
Two-row naked				
Baku	709	19.3	18.6	18.9
Six-row hulled				
Coast	690	32.3	23.7	28.0
Horsford	877	18.7	15.3	17.0
Six-row naked				
Nepal	595	16.7	20.8	18.7

All plats in the experiment were sown at the rate of 4 pecks per acre. Date of seeding, March 30. Only one plat was sown on each soil preparation of Orel and Nepal, due to lack of space. The bushel weight used in computing these yields was 48 pounds throughout. Losses through hail have been accounted for in the yields of all plats of Blackhull and Horsford.

WYOMING

Cheyenne Experiment Farm, Archer (A. L. Nelson). (Nov. 2) The weather for the month of October has been dry, with mild temperatures. The precipitation for the first thirty days amounted to 0.27 inch. On the 31st we received a snow of 0.30 inch precipitation, making a total of 0.57 inch. There were no freezing temperatures until the 20th since which date winter temperatures seem to be with us.

The mild dry weather has furnished ideal conditions for the harvesting of spring crops, which were late in maturing due to the late spring. Threshing was in good progress in this region when the storm of October 31 occurred. Threshing at the station was completed the forenoon of October 30. Fair yields were secured from most varieties, though rust was quite prevalent. Some farmers report that under field conditions Acme, C.I.No. 5284, doubled the yield of Arnautka, C.I.No. 1493, due to the rust resistance of the former.

Winter wheat seeded on fallow is looking fine but that seeded in disked oat stubble is not making much of a showing due to the dry condition of the soil.

From now on work at the station will consist of preparing for the winter.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W. E. Brentzel) (Nov. 2) An effort was made to obtain data on varietal resistance and susceptibility of flax to wilt, Fusarium lini. This work has by no means been completed, though the results of the first set of experiments may be of interest.

About 200 different strains and varieties of seed and fiber flaxes were obtained from various sources and sown in rows 5 feet long. These were replicated three times on ground that has had flax continuously for a number of years and that is known to be severely infested with the fungus causing flax wilt. Sowing was done late in order that the conditions for infection might be more favorable. When the seedlings emerged they were counted. They were then observed frequently as they grew from the seedling stage to maturity and the number dying as a result of wilt noted. The degree of resistance was expressed by dividing the number of plants maturing by the number emerging.

The data given are summaries showing the percentage of resistance of some of the different groups of strains and varieties arranged as to kind and source of seed.

Description of variety	Source of seed	Number of strains or varieties tested	Percent resistance
Seed flax	Abyssinian	7	8
Seed flax	Argentine	36	18
Seed flax	European	47	3
Seed flax	Mongolian	6	0
Seed flax	Turkish	4	0
Textile fiber	Japanese	7	35
Textile fiber	European	25	24
Checks:	N.D.R. No.114	Average of ten 5-foot rows	46
	N.D.R. No.155	Average of ten 5-foot rows	17

The highest degree of resistance of any one variety was shown by a Japanese textile fiber flax, C. I. No. 222, with a resistance of 93 percent as an average for three 5-foot rows.

Northern Great Plains Field Station, Mandan (J. C. Brimsmade, Jr.) The last half of October has continued warm and dry.

(Nov. 1) The last few rows of late flax were harvested October 28. Threshing was completed on everything else October 30.

Volunteer flax which came up from seed scattered by grasshoppers before the crop was harvested is still growing in spite of the fact that a minimum temperature of 14° was recorded October 28 and of 13° November 1. The lowest temperature previous to October 28 was 25°, recorded September 30.

Maximum temperature for the last half of October was 74°, recorded October 19; minimum, 13°, recorded November 1; precipitation, 0.18 inch.

Dickinson Substation, Dickinson (Ralph W. Smith). No report.

MONTANA

Judith Basin Substation, Moccasin (Ralph W. May). (Nov. 1) The spreading of straw on the straw mulch plats, the taking of stand estimates on all the winter wheat, and the proper storage of the grain in the granary is all of the outdoor work that remains to be done under the Cereal Project. I finished cleaning and weighing the grain from the spring nursery the past week, October 25-30.

All winter wheat which was sown early looks good, but most fields show spots of unequal growth due to variable amounts of soil moisture. The winter wheat nursery which was sown October 2-4 has not all emerged.

The acreage of winter wheat in the Judith Basin is very small compared with other years, due to the low market value of this season's crop and to the fact that the farmers were very late in finishing threshing this fall.

The precipitation for October was 0.65 inch which is a little more than half the normal. The maximum temperature for the month was 70° on the 1st and the minimum 11° on the 31st. Wheat is not suffering for moisture and there is sufficient moisture in the soil to germinate all seed that is sown.

The yields of the various cereal varieties grown in fiftieth-acre plats replicated five times in 1920 are as follows: (This compilation of yields is preliminary and more careful checking in preparing the annual report will probably cause some changes.)

WINTER WHEAT

Variety	C.I.No.	Yield	Variety	C.I. No.	Yield
Kharkov sel.	1583-30	26.5	Kharkov(Mont.No.36)	5549	21.7
Minturki(Minn.No.1507)	6159	24.8	Kharkov	1583	20.5
Girgeh	1580-6-1-10	23.1	Kanred	5146	20.0
Servian	1728-+-1-10	22.7	Buffum No. 17	5[illegible]	19.7
Turkey	1558	22.0	Minhardi(Minn.No 1505	5[illegible]	19.3

SPRING WHEAT

Durum

Variety	C.I.No.	Yield	Variety	C.I. No.	Yield
Peliss	1584	22.7	Acme	5284	21.1
Kubanka	1[illegible]0	22.7	Arnautka	+[illegible]64	21.1
Monad	3120	22.0	Kahla (Black durum)	5325	19.0
D-5	5122	21.7			

Common

Hard Federation*	+733	30.0	Marquis	5041	23.[illegible]
White Federation*	+761	30.0	Haynes	2[illegible]4	22.2
Red Bobs	6255	27.1	Preston	[illegible]01	22.7
Early Red Fife	+332	26.5	Laramie	6235	21.2
Kitchener	+[illegible]00	24.7	Kota	62[illegible]6	21.0
Pioneer	+324	23.8	Power	[illegible]07	20.1
Huron	+335	23.5	Rudy	6[illegible]7	20.0
Marka	+377	23.5	Prelude	+52[illegible]	12.7

*Grown in single fiftieth-acre plats.

OATS

Variety	C. I. No.	Yield	Variety	C.I.No.	Yield
Albion	729	46.0	Danish	441	44.4
Lincoln	738	45.6	Victory	742	44.4
Dakota No.4	755	45.3	Sixty-Day	165	41.9
Banner	751	45.0	Sixty-Day	165-4-P-4	41.9
Silvermine	714	44.9	Swedish Select	134	41.9
Richland	787	44.7	Nebraska No.21	841	37.8

Barley

Melby	1176	34.0	White Smyrna	910	27.5
Himalaya	620	29.0	Coast	690	27.5
Hannchen	551	29.2	Francoman	680	27.3
White Smyrna	195	29.2	Mariout	261	24.4
Svanhals	187	29.2			

Flax

N.D.R.No.114	13	10.7	N.D.R.No.52	8	8.6
Russian	19	10.4	Fargo Common	18	8.4
Montana Common	6	9.8	Sel. Russian	3	8.0
Primost	47	8.6	N.D.R.No.73	14	7.9

Following are the results in the furrow-drill experiments:

Straw-mulching experiment

Rate of straw mulching	Average yield of four plats, bus. per acre. Furrow drill	Ordinary drill
None	18.9	17.5
¼ ton	18.2	10.9
½ ton	17.8	10.8
1 ton	18.8	12.5
2 ton	18.9	15.5
3 ton	17.0	14.4
Average	18.3	13.6

Type of Drill-Rate-and-Direction of Seeding Experiment

Average Yield of Four Plats

Rate of seeding	Furrow Drill		Ordinary Drill	
	North & south	East & west	North & south	East & west
2 pecks	14.2	22.7	7.7	13.1
3 pecks	15.8	23.3	10.5	16.2
4 pecks	17.3	25.8	13.8	17.9
5 pecks	17.9	26.7	17.3	18.5
Average	16.3	24.6	12.3	16.4

In all cases the furrow drill plats received but half as much seed as the ordinary drill plats. This was due to the drill being set at the above rates and half of the spouts being closed. The man in charge of the work at that time for some reason did not regulate the rate of seeding of the drill after closing the spouts.

WESTERN BASIN AND COAST AREAS
(South to North and West)

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). No report.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Archer). No report.

OREGON

Oregon Agricultural Experiment Station, Corvallis, (C. E. Owens) No.Report

Harney County Branch Station, Burns (Obil Shattuck). In a recent letter, Mr. Shattuck reported 1920 yields of cereal varieties on both irrigated and dry-farmed land, as follows:

CEREALS GROWN UNDER IRRIGATION

SPRING WHEAT

Variety	C.I.No.	Yield Bushels per acre Ser.1	Ser.2	Average
Federation	4734	84.7	81.2	82.4
Dicklow	3663	76.3	78.0	77.1
Early Baart	1697	66.4	63.6	65.0
White Bobs	2626-1	66.5	61.6	64.0
Marquis	4158	74.1	53.9	64.0
Red Bobs (Canada)		58.1	64.0	60.0
Galgalos	2398	62.7	53.9	58.3
Pacific Bluestem	4067	61.0	54.0	57.5
Golden Ball	6227	54.6	56.0	55.3
Hard Federation	4733	55.0	55.3	55.1
Oudehaard	6228	52.4	57.4	54.9
Emmer		53.8	49.7	51.7
Acme (durum)		59.1	42.7	50.9

WINTER WHEAT

Little Club	4066	33.6	43.6	38.6
Turkey	1558	33.0	43.0	38.0
Khapli	1442	31.8	38.1	34.9
Hybrid No.128	4326	33.0	35.6	34.3
Pacific Bluestem	4087	26.6	35.0	30.8
Kanred	5146	23.1	38.5	30.8
Nat. Hybrid No. 26	5147	21.0	31.1	26.0
Early Baart	1697	25.2		25.2

SPRING OATS

Rustless Selection	724	124.7	130.0	127.3
Swedish Select	1342-1	118.1	116.8	117.4
Silvermine	720	103.7	110.0	106.8
Neb. No. 21		91.8	101.0	96.4
Big Four		94.5	94.5	94.5
Sixty-Day	625	90.5	93.0	91.7
Fulghum	708	89.2	86.6	87.9
Sixty-Day 62-II-19-2		84.0	90.6	87.3

SPRING OATS

Variety	C.I.No.	Yield Bushels per Acre Ser. 1	Ser. 2	Average
Hulless		81.3		81.3

SPRING BARLEY

Coast	690	74.6	88.0	81.3
Utah Winter (Spg)	592	76.1	85.7	80.9
White Smyrna	658	70.9	79.2	75.0
Trebi	936	57.7	77.0	67.3
Hannchen	531	53.4	72.6	63.0
Swan-neck	167	59.9	63.0	61.4
White Hulless	595	44.5	72.2	58.3
Blackhull	878	58.4	49.9	53.1
Hooded		31.0	40.0	35.5

WINTER RYE

Advance	33.6
Abbruzzes	31.5
Spring No. 26101	29.5
Minnesota	25.8
Wis. Pedigree	25.5
Local	18.5
Johannesburg	17.2

BARLEY RATES OF SEEDING

Variety	Rate	Ser. 1
Trebi	80 quarts	105.0
Trebi	100 quarts	103.1
Trebi	120 quarts	92.7
Hannchen	80 quarts	100.6
Hannchen	100 quarts	96.2
Hannchen	120 quarts	105.0

CEREALS GROWN ON DRYLAND

SPRING WHEAT

Variety	C. I. No.	Ser.1	Ser. 2	Average
Oudebaard	6228	37.8	36.4	37.1
Early Baart	1697	32.5	40.6	36.5
Little Club	4066	32.2	33.6	32.9
Pacific Bluestem	4067	30.8	33.0	31.9
Bobs	2826	30.8	31.6	31.2
Federation	4734	31.6	30.3	31.0
Marquis	4196	28.0	29.0	28.5
Acme	5284	23.1	26.6	24.8
Golden Ball	6227	24.1	18.8	21.9
Hard Federation	4733	22.7	19.8	21.2

WINTER RYE

Variety	C.I.No.	Ser. 1	Ser. 2	Average
Abruzzes		12.0	21.0	16.5
Johannesburg		13.5	17.2	[illegible]
Minnesota		16.7	13.5	16.1
Wis. Pedigree		7.5	19.8	13.6
Advance		10.5	16.1	13.3
Spring No. 26101		12.7	13.8	[illegible]
Local		13.8	12.3	13.0

SPRING BARLEY

White Smyrna	656	33.0	30.8	31.9
Swan-neck	187	33.2	30.1	31.6
Hannchen	551	32.2	30.6	31.4
Coast	690	28.3	26.1	27.2
Utah Winter (Spg)	532	33.2	20.2	26.7
Trebi	936	31.0	14.6	22.8
White Hulless	595	20.4	15.5	17.9
Hooded		17.1	17.5	17.3

SPRING OATS

Neb. No. 21		17.7	19.0	18.3
Sixty-Day 62-II-19-2		19.0	17.7	18.3
Big Four		19.6	17.0	18.3
Sixty-Day	625	17.0	17.0	17.0
Silvermine	720	21.0	13.1	17.0
Swedish Select	134	20.1	11.2	15.6
Rustless Sel	724	19.6	7.8	13.7

RATE OF SEEDING

Variety	Rate	Ser.1	Ser.2	Average
Early Baart Wheat	20 lbs.	31.5	31.8	31.6
	30 lbs.	30.8	39.2	35.0
	45 lbs.	28.3	45.1	36.7
	60 lbs.	23.4	35.7	34.5
S.P.I. No. 26101 Rye	2 pks.	19.1	23.6	21.3
	4 pks.	20.2	23.6	21.9
	6 pks.	25.7	28.1	25.1
Sixty-Day Oats	2 pks.	31.2	44.6	37.9
	4 pks.	32.2	25.6	28.9
	6 pks.	46.3	24.9	36.6
White Smyrna Barley	2 pks.	25.6	18.4	22.0
	4 pks.	45.0	32.7	38.8
	6 pks.	39.7	36.4	38.0

DATE OF SEEDING

Variety	Date	Ser. 1	Ser.2	Average
Early Baart Wheat	April 21	19.2	20.3	19.7
	May 1	13.3	16.6	14.9
S.P.I. No. 26101 Rye	April 21	25.9	32.2	29.0
	May 1	17.6	32.6	25.1
	May 14	16.5	26.2	21.3
Sixty-Day Oats	April 21	27.5	47.2	37.3
	May 1	41.3	42.6	41.9
	May 14	42.0	34.1	38.5
White Smyrna Barley	April 22	40.5	38.7	39.6
	May 1	41.5	38.7	40.1
	May 14	23.0	34.4	28.5

WASHINGTON

Adams Branch Station, Lind (M. A. McCall) No Report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones) No Report.

Agricultural Experiment Station, Berkeley (W. W. Mackie) No Report.

Plant Introduction Station, Chico (V. H. Florell) (Nov. 2) Field plats of varieties of wheat and barley were sown on November 1 and 2. The seed bed, although rather dry, is in very good condition. The second date-of-seeding cereals has also been sown. The October 15 sowings germinated promptly and with good stands. The general nursery sowings will be made as rapidly as time permits.

Farmers generally are busy sowing fallow land to wheat. Most of this acreage is sown broadcast.

Several good rains, amounting from 1 to 2 inches, fell about the middle of September. The soil, however, is drying out rapidly.

Rice men are rejoicing over the fair weather which was absolutely necessary to ripen late sown fields, and to allow harvesting operations to proceed. There was considerable delay in harvesting for a period of about two weeks.

C E R E A L C O U R I E R

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Vol. 12 December 1, 1920. No. 28
Personnel (Nov. 16-30) and Field Station (Nov. 16-30) Issue.

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PERSONNEL ITEMS

L.C. Aicher, superintendent of the Aberdeen, Idaho, Substation, has completed his annual report and left Washington on December 1. He will stop over in Chicago to study the exhibits at the National Hay & Grain Show, and to confer with scientific men assembled there at that time.

Henry D. Barker, agent in black rust investigations in cooperation with the Minnesota Agricultural Experiment Station, resigned on November 11, to accept a position with the Farm Crops Department of the Minnesota College of Agriculture.

Elmer C. Faris, field assistant in the barberry eradication campaign, in Nebraska, has completed the work for which he was appointed and his appointment was terminated effective November 24.

James Godkin, field assistant in smut control studies in Illinois, resigned effective October 31, the work for which he was appointed having been completed.

Merle T. Jenkins completed his corn experiments at St. Peter, Minn., for the season and returned to Washington on November 26.

George R. Schroll, field assistant in barberry eradication in Nebraska, completed his work November 30, and his appointment was terminated effective on that date.

Ernest R. Schultz, field assistant in the barberry eradication campaign in Illinois, resigned November 15, on completion of field work for the year.

Dr. H.L. Shantz, formerly engaged in physiological investigations of plant growth, and who returned a few months ago from more than a year of agricultural exploration in Africa for the Office of Foreign Seed and Plant Introduction, has been made Physiologist in Charge of Physiological and Fermentation Investigations of the Bureau, succeeding Dr. Rodney H. True, who resigned June 30, to become Professor of Botany in the University of Pennsylvania.

John B Sieglinger, assistant agronomist in charge of broom corn and grain sorghum investigations at the Woodward Station, Woodward, Okla., arrived in Washington on November 28, to prepare his annual report and to continue laboratory studies.

C.W. Warburton left Washington November 28 for Chicago, Ill., to attend the annual meeting of the International Crop Improvement Association, held in connection with the International Hay and Grain Show at Chicago, and for Ames Iowa, to confer with experiment station officials regarding the cooperative experiments and the preparation of manuscripts relating thereto.

VISITORS

Floyd B. Nichols, Managing Editor of the Capper Farm Press, a chain of agricultural newspapers in Kansas and adjoining States with headquarters at Topeka, Kans., was an office visitor November 17, at which time he discussed the cereal experiments in progress in the territory in which he is interested.

Gail F. Puttick was an office visitor November 18 and 19, while en route from St. Paul, Minn., to South Africa, where he is returning to accept appointment in the Department of Agriculture of the Union of South Africa under the immediate direction of Prof. I.B. Pole-Evans. Mr. Puttick has spent five years in the United States in studying plant pathology and genetics, three years at Cornell University, and two years at the University of Minnesota.

PUBLICATIONS

Farmers' Bulletin 1147 entitled "Milo, A Valuable Grain Crop," by Denton D. Rothgeb, was received November 30.

A paper entitled "Another Sclerospora of Philippine Maize," by Dr. William H. Weston, Jr., has been submitted for publication in the Journal of Agricultural Research, and will appear in the number for February 1, 1921.

California Agricultural Experiment Station Bulletin No. 325, entitled "Rice Irrigation Measurements and Experiments in Sacramento Valley, 1914-1919," by Frank Adams, irrigation engineer, for California, of the Office of Irrigation Investigations, of the Bureau of Public Roads and Rural Engineering, was issued in September, 1920. This bulletin contains, among other data, the results of cooperative investigations of irrigation of rice at the Biggs Rice Station, Biggs, Calif.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins). No report.

GEORGIA

State Experiment Station, Athens, and Substations (H.P. Cheves). All seeding of fall grains has been completed but is much later than usual due to the very dry weather prevailing all fall which prevented preparation of the seed bed. All grain seeded on freshly plowed dry soil is germinating very slowly but it is hoped that the rain which fell on Nov. 15 will bring it out.

The amount of fall sown grain in this State was very materially reduced by the general dry weather and what was seeded has put in so late that the yields

will be cut accordingly.

Coastal Plains Experiment Station, Tifton, Ga. Seeding of cereal experiments conducted in cooperation with the Coastal Plains Experiment Station was completed on Nov. 6. The soil at this place was in ideal condition for seeding and good results are expected.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil) No report.

VIRGINIA

Arlington Farm, Rosslyn (J.W. Taylor). No report.

NEW YORK

Cornell University Experiment Station, Ithaca (H.J. Love) During the first part of the month the oats from the rod row nursery were threshed and the barley is now being threshed. Owing to the unfavorable season, particularly in the early part of the spring, the oat yields are low and, in general, the season was more favorable to the later oats. Some of the selections are still showing up in a very promising way. For example, the selection known as 110-36 is again giving a very good account of itself and with the exception that it is grey in color and has a tendency to shatter if allowed to stand after it is over ripe, it is one of the best sorts we have. Reports are coming in from farmers who have multiplied some of our pure-line strains and some very good yields have been obtained. One good sized field from Lincoln Selection 109-15 near Hall, N.Y. gave just a little less than 90 bushels per acre. In two other cases this same oat yielded 75 and 77 bushels.

Some work on the smut resistance of oats is now being planned, especially with certain strains which do not seem to be so much affected as others. Crosses between these and the more susceptible types will be tested to determine the mode of inheritance.

Seed is now being prepared for sowing in the greenhouse. This consists in the main of an inheritance study in a cross between Polonicum and the "wild wheat" or Emmer together with a large number of new hybrids which were made last year. These consist of many species hybrids as well as hybrids between more closely related forms.

INDIANA

Indiana Agricultural Experiment Station, La Fayette (H.G. Jackson and [illegible] Mains) No report.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington (J.R. Holbert) No report

WISCONSIN

Agricultural Experiment Station, Madison (J.G. Dickson). No report.

IOWA

Agricultural Experiment Station, Ames (L.C. Burnett) No report.

MISSOURI

State Experiment Station, Columbia (L.J. Stadler) No report.

GREAT PLAINS AREA (South to North)

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger) No report.

KANSAS

State Experiment Station, Manhattan (John H. Parker) No report.

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman) No report.

WYOMING

Cheyenne Experiment Farm, Archer (A.L. Nelson) The weather for the past fifteen days has been quite cold, the temperature reaching 8 degrees below zero on the night of the eleventh. The maximum temperature, 54 degrees, occurred on the third. For eight days during the past two weeks the maximum temperature has been below freezing. These temperatures in connection with a week of misty, foggy weather have made weather conditions very unpleasant. The precipitation consisted of a light snow amounting to .15 of an inch.

The following are the acre yields of winter and spring wheats:

Winter Wheats

C.I.No.	Variety	Yield per acre
	Crimean Group	
5146	Kanred	21.0
2998	Turkey	18.6
1432	Crimean	18.1
1559	"	18.0
1437	"	17.7
2908	Nebraska	17.7
1785	Arnautka	17.6
5797	Alberta Red	17.6
2979	" "	17.2
6135	Minturki	16.6
1582	Crimean	16.6
1583	Kharkov	15.9
1442	"	15.1
1571	Turkey	12.0
1543	Beloglina	11.3
6213	Red Winter	11.3
6251	Blackhull	9.0
	Miscellaneous	
3330	Buffum No. 17	17.2
1458	Ghirka Winter	14.2

Common Spring Wheats

C.I.No.	Variety	Yield Per Acre
	Fife Group	
3697	Power	8.2
3641	Marquis	8.1
3022	Rysting	3.8
	Bluestem Group	
2874	Haynes	4.1
	Preston Group	
2397	Erivan	14.3
4141	Converse	14.3
4324	Pioneer	9.2
3081	Preston	8.5
	Miscellaneous	
2398	Galgalos	19.0
4377	Norka	16.3
4800	Kitchener	8.1
4154	Ladoga	8.1
4935	Huron	7.4
6047	Ruby	6.7
6233	Laramie	6.7
4323	Prelude	6.2

Durum Wheats

C.I.No.	Variety	Yield per Acre
	Kubanka Group	
1440	Kubanka	18.3
3320	Monad	17.9
5284	Acme	17.9
1516	Kubanka	17.9
5296	Minidum	14.9
5295	Buford	14.1
4064	Arnautka	13.4
4063	Kubanka	12.9
1493	Arnautka	11.6
1593	Marouani	11.3
1520	Beloturka	7.2
	Red Durum Group	
3322	D-5	16.7
	Miscellaneous	
6227	Golden Ball	16.7
	Peliss Group	
1584	Peliss	14.3

On the whole the quality of the wheats is but fair. However, the durum wheats are much better than either the common spring or winter varieties. Acme gave the highest bushel weight, 63 pounds. Rust was an important factor this year in the determination of yields and quality.

For the past two weeks the work at the station has consisted of finishing fall work. The mess hall closed today.

Yields of Wheat Varieties Replicated 3 Times at the Sheridan Field Station, Sheridan, Wyoming, in 1920.

Winter Variety	C.I.No.	Yield - bu. per acre 1	2	3	Average	Bu. Wt. lbs.
Khankov	1442	40.0	37.7	38.3	38.7	60
Crimean	1559	32.3	37.7	39.0	36.3	59
Turkey	1571	36.7	30.7	36.7	34.7	58
Shirka Winter	1438	32.7	31.3	36	33.7	59
Beloglina	1543	28.0	32.7	35.3	32.0	58
Kanred	5146	30.7	32.3	33.3	32.0	59
Buffms No.17	3330	31.7	30.0	31.0	30.9	57

Spring Variety	C.I.No.	Yield - bu. per acre 1	2	3	Average	Dur. No. Hts.
Arnautka	4064	26.0	27.7	26.0	26.2	61
Ghirka Spring	1517	19.7	27.0	30.0	25.4	63
Kubanka	1440	25.3	27.0	24.7	25.7	59
Power	3697	18.0	28.3	28.7	25.0	58
Glyndon	2873	17.0	25.7	23.3	22.7	66
Preston	5081	18.3	21.0	27.7	25.3	60
Kubanka	4065	22.7	20.3	21.7	21.2	60
Haynes	2874	20.0	18.0	24.0	21.0	55
Marquis	3641	11.7	23.7	24.3	20.6	58
Pioneer	4524	15.3	17.7	24.7	19.2	58
Pelisa(a)	1584	15.0	20.0	19.0	17.3	59
Prelude(b)	4323	15.3	14.3	18.7	16.1	60

(a) First seeding of Peliss failed to germinate although bulk seeding from same seed emerged with a fair stand. Reseeded 5-10. Second seeding gave poor stand and grain was very weedy, mostly sunflowers.
(b) Prelude damaged about 20% by hail 6/8. Other varieties now as far along in growth damaged slightly.

The large variation in Series 1 noticeable with a large number of the varieties of spring wheat was apparent throughout the season.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (W.T. Brentzel) No report.

Northern Great Plains Field Station, Mandan (J.C. Brinsmade, Jr.) No report.

Dickinson Substation, Dickinson (Ralph W. Smith). Winter weather set in on November 6 with a small blizzard and the ground has been frozen since that time. The ground is nearly bare, however, and with a continuance of the present warmer weather more fall plowing may yet be done. More plowing was done by the farmers this fall than for several seasons past, the ground being in a moister condition than during the past few years at this time of year. A rain and sleet storm totaling an inch of moisture occured during the last week of October making a total for the year of nearly 16 inches, which is slightly above the normal annual precipitation.

The cleaning of the seed of the different cereal varieties is now nearly completed and samples of wheat varieties for the milling experiments have been prepared.

Due to the effect of rust on the wheat crop this year there is an increased demand for Kubanka wheat and all available rust-resistant varieties. Much of late-sown early escaped with little rust.

There was an increased acreage of corn this year and the yields in this county were generally good. Most of the corn, oats and barley grown here is being retained on the farm for feed this year. This is due partly to the low market prices of those grains and partly to the shortage of feed here for several years, causing the farmers to adopt a policy of preparedness

MONTANA

Judith Basin Substation, Moccasin (Ralph . May). No report.

WESTERN BASIN AND COAST AREAS
(South to North and West)

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). No report.

IDAHO

Aberdeen Substation, Aberdeen (E.G. Aicher). No. report.

OREGON

Oregon Agricultural Experiment Station, Corvallis (C.E. Owens) No report.

WASHINGTON

Adams Branch Station, Lind (M.A. McCall) No report.

CALIFORNIA

Rice Field Station, Biggs (J.W. Jones)

Agricultural Experiment Station, Berkeley (W.W. Mackie) No report.

Plant Introduction Field Station, Chico (W.H. Florell) (Nov. 15) A considerable portion of the cereal sowings were made between Nov. 1 and 10. Heavy rains have fallen since the latter date which will delay further sowings until the land is again in fit condition. All field plat and increase varieties have been sown, also nursery barley varieties and selections; Australian wheat varieties and White Australian selections; varieties of oats; the barley hybrid and classification nursery; the wheat classification nursery, and miscellaneous wheat varieties in the nursery. There remain to be sown the hybrid wheat material, and Dr. Love's hybrid material which has just arrived.

Some of the cereals sown are beginning to emerge. With a little warm weather and sunshine conditions will be very favorable for germination.

The total seasonal precipitation to date has been 5.94 inches.

Dr. Ball is now in California and will visit the Chico Station on Wednesday, Nov. 17.

C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations
Bureau of Plant Industry, U. S. Dept. of Agriculture
(NOT FOR PUBLICATION)

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Vol. 12 December 16, 1920 No. 29
Personnel (Dec. 1-15) and Field Station (Dec. 1-15) Issue

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PERSONNEL ITEMS

Gordon C. Curran, field assistant in the barberry eradication campaign in Minnesota, completed the field work assigned to him on December 3, and his appointment was then terminated.

Harry E. Dobbins, field assistant in the barberry eradication campaign in Ohio, resigned November 27 on the completion of the field work assigned to him.

Mrs. Rose E. Gamble, botanical artist, sailed December 9 for England where she expects to remain until the latter part of January visiting her family at Harrow-on-the-Hill.

Chester I. Greene, clerk in the office of James R. Holbert at Bloomington, Ill., resigned October 7 to accept a commercial position.

James R. Holbert was at Chicago, Ill., November 27 to December 3, in connection with the exhibit of corn root, stalk, and ear rot experiments at the International Grain and Hay show.

James R. Holbert reports that a utility corn show will be held at Galesburg, Ill., January 5 and 6, 1921. In this show samples will be judged according to their freedom from disease and their germinating power, as well as their uniformity to type. A special score card and the rules and regulations of the show were prepared by Dr. W. L. Burlison and J. C. Hackleman of the College of Agriculture, University of Illinois; E. M. D. Bracker, County Agent in Knox County; E. D. Funk, farmer and corn breeder, Bloomington, Ill.; M. L. Mosher county agent in Woodford County, Ill. and President of the National Association of County Agents; Walter Rowe, corn judge and Secretary of the Illinois Corn Growers' Assn.; and O. J. Sumner, Corn breeder. All samples of corn must be delivered to the Knox County Farm Bureau not later than December 24, 1920. Germination tests will be made and prizes awarded before the opening of the show on January 5. In the score card the germination record counts 35 per cent, of which 20 per cent is assigned to vitality and vigor, and 15 per cent to freedom from disease

symptoms. Evidences of freedom from disease also count heavily under the heading of "General appearance," to which 45 points are assigned. The remaining 20 points are given to type and uniformity.

John M. Holzinger, field assistant in the barberry eradication campaign in Minnesota, completed the field work assigned to him on December 3, and his appointment was terminated on that date.

Dr. George M. Reed, pathologist in charge of cereal smut investigations, has resigned effective December 31, to accept the position of curator of plant pathology at the Brooklyn Botanical Garden.

William C. Rogers, agent in connection with corn experiments in South Carolina, has completed the work assigned to him and his appointment was terminated November 30.

Neil F. Thompson, pathologist in charge of the barberry eradication campaign in Wisconsin, was in Chicago November 27 to December 3, in connection with the barberry eradication exhibit at the International Grain and Hay Show.

C. W. Warburton returned to Washington December 7 from Ames, Iowa, where he consulted with experiment station officials regarding cooperative experiments and the preparation of a manuscript in connection therewith. He also attended the International Grain and Hay Show and the Second Annual Meeting of the International Crop Improvement Association. A large number of excellent samples of grain were displayed and interesting exhibits were made by the Department of Agriculture and several of the State Experiment Stations.

VISITORS

Hugh J. Hughes, State Commissioner of Markets in Minnesota, and formerly editor of Farm Stock and Home, was an office visitor December 10.

PUBLICATIONS

Separates have been received of an article entitled "Fusarium Blight (Scab) of Wheat and Other Cereals" by Dimitr Atanasoff, formerly assistant in plant pathology, University of Wisconsin. This paper was published in the Journal of Agricultural Research, vol. 20, No. 1, p. 1-32, 4 pl. 2 fig., on October 1, 1920. The experiments reported in this paper were conducted in cooperation with the Office of Cereal Investigations.

Copies have been received of Utah Agricultural College Experiment Station Bulletin No. 175, "Sixteen Years of Dry-Farm Experiments in Utah" by F. S. Harris, A. F. Bracken, and I. J. Jenson. This Bulletin of 43 pages is for the most part devoted to a report of the cooperative investigations conducted at the Nephi substation.

A paper entitled "Fungicidal Dusts for Control of Smut," by W. W. Mackie and Fred N. Briggs, was published in Science, n. s., vol. 52, no. 1353, p. 540-541, December 5, 1920. The experiments here reported were conducted cooperatively by the Office of Cereal Investigations and the California Agricultural Experiment Station.

Farmers' Bulletin 1124, "The Brown Spot of Corn, with Suggestions for its Control," by Dr. W. H. Tisdale, was issued December 7. This 9-page bulletin is a popular statement of the studies reported in a paper entitled "Physoderma Disease of Corn" Jour. Agr. Research, vol. 16, no. 5, p. 137-154, February 3, 1919.

The National Research Council has issued in mimeographed form a "Bibliography of Investigations Bearing on the Composition and Nutritive Value of Corn and Corn Products," by M. Helen Keith, of the Illinois Agricultural Experiment Station. This work consists of 178 pages of references to publications on the subject indicated in the title. A copy is available in the Department Library. Those who desire individual copies can obtain them from the National Research Council on payment of $2.00.

FIELD STATION CONDITION AND PROGRESS

HUMID EASTERN STATES (South to North)

LOUISIANA

Crowley Rice Station, Crowley (J. Mitchell Jenkins) No Report.

GEORGIA

State Experiment Station, Athens and Substations (R. R. Childs). No Report.

TENNESSEE

State Experiment Station, Knoxville, and Substations (C. Kurtzweil). No Report.

VIRGINIA

Arlington Farm, Rosslyn (J. W. Taylor). Rains during the month of November and the first half of December have improved the appearance of the fall-sown cereals. The fall growth of all crops, rye, wheat, oats, and barley, is not as heavy as last year and should be better able to withstand the low temperatures and drying winds of winter. Wheat sown the middle of September has made a heavy growth and is infected with leaf rust. Wheat sown the last of October is still in the 2-leaf stage.

Several hundred pots of wheat, oats, and barley have been sown in the greenhouse. These are largely hybrids or varieties to be crossed this winter.

The total rainfall for November was 4.14 inches; the rainfall from December 1 to 15 was 2.77 inches; maximum temperature, 54°; minimum temperature, 25°.

NEW YORK

Cornell University Experiment Station, Ithaca (H. H. Love). No Report.

INDIANA

Indiana Agricultural Experiment Station, La Fayette (A. S. Jackson and E. B. Mains). No Report.

OHIO

College of Agricultural of Ohio State University, Columbus (John W. Baringer). The following table contains the number of properties on which barberries were found in the farm to farm surveys in Ohio counties and the number from which the bushes were removed. The table also shows the number of bushes found and the number removed on these properties. The total number of properties in each county on which bushes were found, the number of bushes located, and the total number removed are also shown.

County	Rural Properties		Rural Bushes		Totals Properties	Totals Bushes	
	Located.	Removed.	Located.	Removed.	Located.	Located.	Removed.
Darke	20	15	116	75	59	613	445
Defiance*	8	5	20	16	28	230	116
Greene	12	8	655	655	47	2,086	1,976
Mercer	6	4	65	53	19	205	192
Montgomery	91	44	1,044	171	799	6,396	2,617
Paulding*	5	1	5	1	9	68	46
Preble	22	21	12,487	12,462	37	12,636	12 601
Van Wert	20	16	535	475	56	829	714

*Counties only half covered by farm-to-farm survey.

ILLINOIS

Cooperative Corn Rot Investigations, Bloomington, (J. R. Holbert). No Report.

Macon County Farm Bureau, Decatur: J. F. Ziegler, assistant county agent, reports as follows to Mr. Fred D. Rhoney regarding an experiment with several varieties of corn and soy beans grown in combination for hogging down on the farm of Elmer C. Paris, near Harristown, Ill.

Acre plats on the following varietal combinations were grown to determine the feasibility of using varieties which ripen successively for hogging down.

Plat No. 1, Northwestern Dent corn and Wisconsin Black Soy Beans
Plat No. 2, U.S. Selection 133 corn and Wisconsin Black soy beans
Plat No. 3, Silver King corn and 13-164 soy beans
Plat No. 4, Lancaster Surecrop corn and 13-164 soy beans
Plat No. 5, Funk Yellow Dent corn, and A. K. soy beans.

The first plat was ready for hogging down on September 10, and on September 16, 46 pigs averaging 68.5 pounds were turned in.

Plat No.	Corn Yield per ac. (a)	Hogs Turned in Date	No. of Hogs	Weight of hogs at beginning, lbs.	Number days in plat	Weight of hogs at end of period, lbs.	Pork per acre, lbs. (b)	Gain per head, lbs.	Gross return per acre (c)
1	65.7	Sept.16	46	3,170	11	3,690	526.0	11.3	$68.38
2	60.0	Sept.27	46	3,690	12	4,040	353.5	7.6	45.95
3	74.3	Oct. 9	46	4,040	12	4,950	919.0	19.8	119.47
4	72.8	Oct.21	46	4,950	12	5,520	575.7	12.5	74.84
5	62.8	Nov. 2	46	5,520	9	6,140	626.2	13.6	81.41
Av.	67.1		46				600.1	12.9	78.01

(a) Green weights as taken from field in September and October
(b) 1/100 of each acre was husked to obtain yields per acre. The gains made were made on 99/100 of an acre but are computed to an acre basis.
(c) Computed at 13¢ per pound of pork.

Mr. Ziegler stated that he thinks the plan of having a succession of varieties for hogging down is good, but that 3 varieties, Northwestern Dent, Silver King, or Lancaster Surecrop, and any corn ordinarily grown in the section, would be sufficient.

WISCONSIN

Agricultural Experiment Station, Madison (J. G. Dickson). No Report.

IOWA

Agricultural Experiment Station, Ames (L. C. Burnett). No Report.

MISSOURI

State Experiment Station, Columbia (L. J. Stadler). Dec.2) The total yield of corn in Missouri in 1920 is estimated at 211,808,000 bushels, equivalent to an average yield of 32 bushels per acre. According to the State Board of Agriculture, 86 per cent of the crop is being gathered for grain, 6 per cent hogged off, and 8 per cent cut for silage. The total production of oats was 43,927,000 bushels and that of wheat 29,393,000 bushels.

The yields of corn varieties grown in duplicated plats 21 by 505 feet each at Kennett, Dunklin Co., in southeastern Missouri, were as follows:

Variety	Yield, bu.	Moisture content, per cent
Eureka Ensilage	29.1	11.6
St.Charles Yellow	23.1	11.6
Commercial White	21.9	11.0
Biggs 7-ear	21.9	12.0
St.Charles White	20.2	11.2
Reid Yellow Dent	20.0	11.6
Boone County White	19.7	11.8

The yields of corn varieties at Maryville in northwestern Missouri were as follows:

Variety	Yield, bu.	Moisture content per cent
Leaming	60.3	17.6
Commercial White	59.7	
Iowa Silvermine	59.7	15.0
St.Charles Yellow	58.2	15.4
Reid Yellow Dent	58.0	16.8
Boone County White	57.6	15.4
St.Charles White	54.4	
Calico	50.1	21.8

The results of corn varietal experiments on other outlying fields are now being determined.

GREAT PLAINS AREA
(South to North)

OKLAHOMA

Woodward Field Station, Woodward (John B. Sieglinger) No Report.

KANSAS

State Experiment Station, Manhattan (John H. Parker). No report.

Fort Hays Branch Station, (A. F. Swanson). At present we have sufficient moisture for fall-sown crops, but so far the weather has been decidedly open with rather high wind velocities. Much of the wheat in the vicinity of Hays and for 50 miles to the east has not made satisfactory growth due to the extreme dryness at seeding time. As the wheat has not made sufficient growth to cover the ground, there is danger of soil blowing.

Four or five days were spent on the Cereal Project in roughening bare ground so as to prevent as far as possible any danger from blowing. On some of the land a 2-row lister was used. Another effective implement has been the conversion of an ordinary cultivator with four 6-inch shovels into a 3-shovel cultivator by removing one of the inner shovels from its shank and bringing the two inner shanks together, leaving one shovel attached. This cultivator leaves the ground corrugated with furrows about 6 inches deep and a foot apart. A light application of straw has also been made in places to prevent soil blowing.

The yields of oats and barley varieties are now available as follows:

SPRING OATS

Variety	C.I. No.	Yield, bu.
Aurora, Kans. No. 5206	823	44.2
Burt, Kans. No. 5020		44.2
Burt x Sixty-Day	727	42.6
Fulghum	708	39.8
Alcion, Iowa No. 103	729	39.3
Red Texas, Kans. No. 5005		37.6

	C. I. No.	Yield, bu.
Kherson	[illegible]	36.7
Sixty-Day	[illegible]	[illegible]
Richland, Iowa No. 105	767	36.4
Burt, Kans. No. 5219 (Gessner)		35.[illegible]
Iowar, Kans. No. 5218	847	28.6
Fulghum, Kans. No. 5175	[illegible]	17.2

Burt (Kans. No. 5219) and Fulghum (Kans. No. 5175) were seeded late and did not have fair chance for maximum yield.

SPRING BARLEY

Variety	C. I. No.	Yield, bu.
Local Six-row		32.6
White Smyrna	195	30.6
Stavropol		29.7
Marlout	261	28.7
Moley	1176	27.6
Beldi	190	26.3
Coast	690	26.1
Himalaya Hull-less	620	22.2
Odessa	162	21.2
Six-Row, Kans. No. 7010		20.1
Six- Row, Kans. No. 7117		17.0
Manchuria	643	17.0
Horsford	307	12.5
Gatami	575	12.0

COLORADO

Akron Experiment Farm, Akron (F. A. Coffman). No Report.

WYOMING

Cheyenne Experiment Farm, Cheyenne (W. L. Nelson). No report.

NORTH DAKOTA

State Experiment Station, Agricultural College, Fargo (T. E. Brantzeh) No Report.

Northern Great Plains Field Station, Mandan (J. C. Brinsmade, Jr.). No Report.

Dickinson Substation, Dickinson (Ralph W. Smith). (Dec. 1) With the exception of about ten days during the first half of November, when the temperature reached a minimum of -11°, the month has been a near approach to Indian summer weather. The ground is bare and although it freezes a little at night the temperature in the afternoon is usually considerably above freezing so that now it is almost entirely thawed out. The total precipitation for the month is about 0.1 inch, which fell in the form of snow early in the month.

The yields obtained from the replicated plots of oats, barley, and flax are given below. These varieties were grown in triplicate in plots of one thirty-second acre each.

OATS

Group and variety	C.I. No.	Yield in 1920, bu.	5-year average bu.1916-1920
Midseason White:			
Early Mountain No.8	754-8	73.3	42.6
Silvermine	659	72.9	43.4
Siberian	741	72.4	42.8
Early Mountain No. 2	656	71.0	40.7
Victory	560	68.0	41.6
Banner	160	67.3	36.9
Swedish Select	134	66.8	40.4
Early Mountain No.11	754-11	66.2	39.8
Big Four	658	65.9	40.4
Lincoln	738	65.4	
Midseason yellow:			
Golden Rain	493	67.7	41.1
	358	60.4	38.4
Early:			
Kherson	459	69.2	37.2
Richland (Iowa No.105)	787	67.7	39.3
Albion (Iowa No.103)	729	63.4	36.9
Sixty-Day	165	62.0	37.3
Nebraska No. 21	841	60.2	
Late:			
White Tartarian*	445	64.2	38.2
White Russian	551	55.7	34.6

*Badly mixed with another variety.

Of the varieties grown for 14 years the highest in yield are Victory, Early Mountain No.2, and Big Four, yielding respectively 53.8, 51.6, and 51.6 bushels per acre.

Yaroslav emmer, grown with the oats for comparison, yielded 47.8 bushels of 32 pounds in 1920, and has a 5-year average yield of 32.7 bushels.

BARLEY

Group and Variety	C.I. No.	Yield in 1920, bu.	5-year(1916-1920) average, bu.
2-rowed hulled			
Scholey	962	51.4	
White Smyrna (S.Dak.No. 28-7-15)	195	50.6	
White Smyrna	658	48.1	22.9
Princess	529	48.0	
Steigum	907	47.8	24.1
Hanna	203	47.5	24.1
Hannchen	531	46.1	23.8
Hoil Hanna No.4	677	45.6	
White Smyrna (S.Dak.No. 28-14-15)	195	44.7	
Svanhals	187	38.4	23.0

BARLEY (Continued)

Group and variety	C.I.No.	Yield in 1920, bu.	5-year (1916-1920) average, bu.
6-rowed hulled			
Odessa	182	44.4	
Manchuria	863	41.5	20.4
White Gatami	575-1	40.6	
Black Gatami	575	39.6	21.8
Mariout	932	37.2	18.5
Chile	663	29.4	15.1
6-rowed hooded			
Nepal (naked)	262	38.0*	17.7*
Horsford (Hulled)	1177	47.1	

*Figured at 48 pounds per bushel as with other varieties.

The highest yielding varieties during the past 13 years are Hannchen and Svanhals, yielding 32.4 and 31.8 bushels per acre, respectively.

FLAX

Variety	C. I. No.	Yield in 1920, bu.	6-year(1915-1920) average, bu.
N. Dak. Res. No.114	13	12.3	6.0
Primost	12	11.0	6.0
N. Dak. Res. 52	8	10.5	6.8
Dumont (N.D.1215)	3	10.3	7.7
Russian	19	9.0	7.2
N.Dak. Res. 73	14	8.3	7.0
	166	12.4*	
	4-1	11.1*	
	165	9.7*	
	164	9.1*	
	163	7.1*	

*Single plats.

MONTANA.

Judith Basin Substation, Moccasin, Mont. (Ralph W. May). (Nov.30). Late-sown winter wheat has not emerged yet. More moisture to pack the surface soil would bring about earlier emergence but on the other hand would cause greater danger of winterkilling.

The straw was spread on the type-of-drill straw-mulch experiment plats on November 27 but no fall straw estimates have been made because all of the wheat has not emerged.

The month has been remarkable for mild temperatures, sunshine, and very little precipitation.

Dean F. B. Linfield of the Montana Agricultural Experiment Station visited here about the middle of the month.

Following are the results of the harrowing experiment in 1920 on wheat sown with the furrow drill. The yields are averages of 5 replications.

Treatment	Yield in bushels per acre		
	6-in. rows	12-in. rows.	Average
Harrowed	25.3	27.0	26.2
Not Harrowed	23.7	24.0	23.9
Average	24.5	25.5	

The purpose of this experiment was to determine the effect on the growth of weeds caused by harrowing wheat sown with the furrow drill in rows 6 inches and 12 inches apart, respectively. No count was made of the weed growth but it was evident that the harrowed plats contained less weeds than the not-harrowed plats, although both contained a good many weeds. It was not possible to make more than one harrowing, partly because of the late wet spring and partly because of the rush of spring work. A spring freshet ran across one end of the plats making it necessary to cut down the plats to half their length.

The 6-inch rows were made by attempting to split the 12-inch rows but this could not be done accurately. The drill was set at 3 pecks but as half the spouts were closed the 12-inch rows received actually 1 1/2 pecks while the 6-inch rows received 3 pecks. The 6-inch and 12-inch row plats were sown alternately. In the following spring, alternate pairs of plats were harrowed and left unharrowed.

The slight difference in yield in favor of harrowing is fairly consistent in all of the replications. The yields from the 12-inch rows on the average are slightly higher than from the 6-inch rows, but the superiority is not nearly so consistent in all of the replications. This experiment was continued in the fall of 1920, but no attempt was made to split the ridges. The wheat was sown at the rate of 3 pecks per acre.

(Dec. 16) Winter wheat does not look good, especially that which was sown late. There is very little moisture in the soil and the seed bed is practically as loose as when the seed was sown. Most of the late-sown wheat is just ready to emerge but has been at that stage for two or three weeks or more. Considerable of the earlier sown wheat has not emerged although the general appearance of the fields would indicate that the wheat is all up. The strong winds of the past week have dried out and soil-blown the fields considerably.

A strong wind on December 14 blew off considerable of the straw on the straw-mulch plats of winter wheat, making the rate of straw applications rather irregular and inaccurate. In general the straw held better on the furrow-drill plats than on the ordinary-drill plats. We have not had any precipitation to speak of since the straw was spread on November 26.

There has been only a trace of precipitation so far this month and only 0.15 inch last month. During October there was 0.65 inch. The lowest temperature this month was 14° and the highest 33° on the 15th and 5th days of the month, respectively.

I am now preparing my annual report and have found some minor errors in my earlier preliminary report which was published in the November issue of the Cereal Courier.

WESTERN BASIN AND COAST AREAS
(South to North and West)

UTAH

Nephi Substation, Nephi (Aaron F. Bracken). The field work on the station came to an abrupt stop on October 9. At this time an additional week of favorable weather would have been sufficient for finishing all work on experimental projects. On Saturday night, October 9, 0.58 inch of precipitation fell, followed by 0.43 inch on October 13, and by the end of the month the almost continuous storm totaled 2.90 inches of moisture, a portion of which fell as snow. This weather continued until the end of the first week in November, and during the whole period team work on the station was impossible due to the wetness of the soil. During the second and third weeks in November more moisture fell and temperatures were below freezing almost every night, but this was not allowed further to delay completion of the work. Seeding of all experiments except the rotations was finished before the storm began, and the rotation plats would have been seeded if the rough surface of the pea and potato plats had permitted drilling. A storm was needed to break the large clods. Seeding of these plats was finished on November 19; all other work was finished on November 23. Before I left the station on November 25, all of the grain in all experiments, except the rotations had emerged with good stands.

The heavy fall of precipitation during October and continuing until the end of the first week in November not only caused considerable delay in threshing in the Juab Valley, but also delayed threshing in the northern part of the State and in southern Idaho. In some sections threshing is not yet finished. The serious part of this delay, however, is the loss caused by the storms. Fully one-fifth of the grain threshed after the storm period is not marketable for milling. In addition the storm caught a number of farmers with fall seeding unfinished, and in this northern section the weather has allowed no opportunity to finish. Farmers are discouraged principally because of the decline in prices for their products.

IDAHO

Aberdeen Substation, Aberdeen (L. C. Aicher). No report.

OREGON

Oregon Agricultural Experiment Station, Corvallis (C. E. Owens). No Report.

Sherman County Branch Station, Moro (D. E. Stephens). No report.

WASHINGTON

Adams Branch Station, Lind (M. A. McCall). No report.

CALIFORNIA

Rice Field Station, Biggs (J. W. Jones). No Report.

Plant Introduction Station, Chico (V. H. Florell). (Dec. 1) With the exception of the remainder of the wheat classification nursery, no cereal sowings have been made since early in November on account of the continued wet weather. The precipitation for November has been 10.68 inches, and rain is now falling. The seasonal precipitation by months is as follows: August, 0.07 inch; October, 1.90 inch; and November, 10.68 inches.

Cereals sown before the rains have emerged with excellent stands with the exception of a portion of the barley identification nursery, where no emergence has been observed in quite a number of the rows.

Dr. Carleton R. Ball visited Chico and the Plant Introduction Garden on November 17 and 18.

(Dec. 15). The prospects are now fairly good for fair weather for a while. The excess moisture in the sandy and loamy soils is disappearing rapidly, while the adobe soils will be full of water for some time. The sandy and loamy soils will soon be in good condition for plowing. A few farmers who have small outfits have begun their winter plowing. If the weather permits, plowing and seeding operations will be in full swing in a few days.

The second of Dr. Harlan's date-of-seeding barleys and the fourth of the regular date-of-seeding cereals were sown today. The sowings made early in December are just beginning to emerge. Germination has been delayed considerably by the cool weather.

The land for Dr. Love's nursery and the regular wheat hybrid nursery was redisked and harrowed yesterday. This was necessary before sowing on account of the weeds which have appeared since the rains. The sowing of Dr. Love's wheat material was begun today.

The cereals sown before the rains are in excellent condition where not injured by excess moisture. A few farmers report that wheat fields on the adobe lands are being injured by standing water.

Agricultural Experiment Station, Berkely (W. W. Mackie). (Dec.10). Dr. Carleton R. Ball recently visited Berkeley, Davis, and other points in northern California where various lines of investigation are being conducted.

The sowings at Davis relating to the rust and smut investigations have been started but were interrupted by rains. The present season, the rainfall to date has been double that to the corresponding date last year and is far above normal. Much grain land is not sown and seeding may be delayed considerably.

The farmers of the State are taking a lively interest in new and improved varieties of wheat and barley. Early Baart, Bunyip, and other Australian wheats are most popular, while California Mariout barley leads in interest on account of its remarkable yield during the dry year just passed. Tennessee Winter and California No. 4000 barleys are also receiving attention on account of their good yielding qualities.

Interest in seed treatment to control smuts continues unabated and good results from the smut campaign are still apparent.

A talk by W. W. Mackie before the Farm Advisors' Conference on fungicidal dusts for control of smuts has created considerable interest. Many farm advisors have placed demonstration tests with copper-sulphate lime dust mixture and copper carbonate dust in their counties. The results on germination and bunt attack will be followed with interest.

C E R E A L C O U R I E R

Official Messenger of the Office of Cereal Investigations,
Bureau of Plant Industry, U. S. Dept. of Agriculture.
(NOT FOR PUBLICATION)

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Vol. 12 December 31, 1920 No. 30
Personnel (Dec. 16-31) and Publications Issue.

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SPECIAL CONTENTS

Scientific Papers Presented at Chicago.

Publications and Manuscripts in 1920

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PERSONNEL ITEMS

Floyd G. Anderson, field assistant in the barberry eradication campaign in Illinois, resigned December 31, the field work for which he was appointed having been completed.

Dixon L. Bailey has been appointed agent in black, leaf, and stripe rust investigations, effective December 27, for service under the direction of Dr. E. C. Stakman. Mr. Bailey is to continue the investigations formerly conducted by H. B. Barker, who resigned recently.

Dr. C. R. Ball left Washington December 27 for Chicago to attend the meetings of the various scientific societies in session there in connection with the annual meeting of the American Association for the Advancement of Science, and to confer with agronomists, pathologists, and others who were in attendance. On December 29 he presented a paper entitled "The Botany of Crop Plants," as a part of the symposium on "The Relation of Botany to Human Welfare," before the joint session of Section G of the A.A.A.S. with the Botanical Society of America and the American Phytopathological Society. He returned to Washington January 1.

Dr. Theodore Holm, who has been employed at intervals during the past several months in translating articles on cereal pathology from Swedish and other languages, has completed the work for which he was appointed and resigned December 31.

Dr. H. B. Humphrey left Washington for Chicago December 26 to attend the sessions of the botanical and agricultural sections of the American Association for the Advancement of Science and affiliated societies, especially the American Phytopathological Society and the Botanical Society of America, and to confer with pathologists who were in attendance thereat. He returned to Washington January 2.

Dr. F. E. Kempton returned to Washington December 18 from an extended trip through the barberry eradication area. During this trip he consulted with pathologists and other State officials concerned with barberry eradication and with State leaders of the campaign in each of the 13 States where the work is being conducted. Dr. Kempton left Washington for Chicago December 26 to attend the botanical and pathological meetings held there in connection with the annual meeting of the American Association for the Advancement of Science.

C. H. Kyle left Washington December 26 for Chicago to attend the meeting of the American Society of Agronomy and other sessions of agronomic interest in connection with the annual meeting of the American Association for the Advancement of Science. He returned to Washington January 1.

C. Larsen, collaborator in the barberry eradication campaign in South Dakota, has resigned effective December 31. Mr. Larsen, who is director of extension in South Dakota, is on leave of absence for a year to become director of the Dairy Marketing Department of the Illinois Agricultural Association. During his absence W. F. Kumlien will be acting director of extension.

Joe D. Morrison, who for several years was scientific assistant in charge of cooperative cereal experiments on the Highmore, S. Dak., substation, and who is now engaged in farming at Phillip, S. Dak., was elected to the South Dakota State Senate at the November elections.

John K. Reilly has been appointed stenographer and typewriter at Bloomington, Ill., effective January 2, to assist J. R. Holbert.

F. D. Richey left Washington December 26 to attend the meetings of the American Association for the Advancement of Science in Chicago, particularly the meeting of the American Society of Agronomy on December 31, where he presented a paper entitled "The Experimental Basis of the Present Status of Corn Breeding." Mr. Richey returned to Washington January 2.

Miss Jessie P. Rose, assistant pathologist in stripe rust investigations at Corvallis, Oreg., who has been on leave without pay since September 8 on account of the illness of her mother, returned to duty December 16.

David E. Stephens, superintendent of the Sherman County Branch Station Moro, Oreg., who has been in Washington for several weeks to consult with crop specialists regarding cooperative cereal experiments, left for Moro December 18.

Dr. W. H. Weston, Jr., left Washington December 27 to attend the scientific meetings in Chicago, where he presented a paper entitled "Oogonial Sclerosporas in the Philippines," before the Mycological Section of the Botanical Society of America.

VISITORS

Charles D. Bennett, formerly scientific assistant in corn investigations, who resigned about two years ago to engage in farming in New York, was an office visitor December 30. Mr. Bennett finds the New York climate too severe for him and will probably locate in Florida.

Ellsworth Bethel, of Denver, Colo., was an office visitor December 27 while en route to Chicago to attend the meetings of the American Association for the Advancement of Science.

E. A. Southee, who has been engaged in post-graduate study at Cornell University for the past year and a half, was an office visitor December 17. Mr. Southee was recently elected principal of the Hawkesbury Agricultural College at Richmond, New South Wales, and is now en route to Australia to take up his new duties.

C. L. Starr, assistant county agent leader in South Dakota, was an office visitor December 30.

PUBLICATIONS

Louisiana Agricultural Experiment Station Bulletin 172, "Rice Investigations," by F. C. Quereau, formerly assistant director of the Rice Experiment Station, Crowley, La. has recently been received. This is an 87-page bulletin in which the cooperative and independent results obtained on the Crowley Rice Station are reported.

Galley proof of an article entitled "Conidial Sclerospora of Philippine Maize," by W. H. Weston, Jr., which is to appear in the February 1 issue of the Journal of Agricultural Research, was read December 17.

SCIENTIFIC PAPERS PRESENTED AT CHICAGO

In addition to the papers presented by Dr. C. R. Ball before the joint session of the Botanical Society of America and the American Phytopathological Society, and by Mr. F. D. Richey before the American Society of Agronomy, noted elsewhere, the following papers by members of the scientific staff of the Office of Cereal Investigations were presented before the American Phytopathological Society and the Mycological Section of the Botanical Society of America.

AMERICAN PHYTOPATHOLOGICAL SOCIETY

1. Rice Straighthead and Its Control, by W. H. Tisdale and J. Mitchell Jenkins.

2. Two Sclerotium Diseases of Rice, by W. H. Tisdale.

3. Two Strains of Puccinia triticina on Wheat in the United States, by E. B. Mains and H. S. Jackson.

4. The Aecidium of the Orange Leaf Rust of Wheat (Puccinia triticina), by H. S. Jackson and E. B. Mains.

5. The Influence of Soil Temperature on the Development of the Seedling Blight of Corn Caused by Gibberella saubinetii, by James G. Dickson.

6. The Nematode Disease of Cereals, A. G. Johnson and R. W. Leukel.

7. Second Progress Report on the Fusarium Blight (Scab) of Wheat, by James G. Dickson, Helen Johann, and Grace Wineland.

8. Experiments with Stewart's Disease on Dent, Flint, and Sweet Corn, by Chas. S. Reddy.

9. The Improved Rag-doll Germinator as an Aid in Controlling Root, Stalk, and Ear Rots of Corn, by B. H. Dandeston and G. N. Hoffer.

10. The So-called Take-all Disease of Wheat in Illinois and Indiana, by H. H. McKinney.

11. The Effect of Certain Chemicals, Especially Copper Sulfate and Sodium Chloride, on the Germination of Bunt Spores, by Noel F. Thompson.

12. Loss from Rye Ergot, by Earle K. Seymour and Frank T. McFarland.

13. Occurrence of Argynnospora in Bulbilis dilatata and Bromus inermis, by Charles Drechsler.

14. The Rhamnus Hosts of Crown Rust, by I. E. Melhus and Florence Willey.

15. The Regional Occurrence of Puccinia graminis on Barberry, by E. C. Stakman, R. S. Kirby, and A. F. Thiel.

16. Kernel Starchiness as an Index of Susceptibility to Root, Stalk, and Ear Rots of Corn, by John F. Trost and G. N. Hoffer.

17. Three Methods of Controlling the Root, Stalk, and Ear Rots of Corn, by G. M. Smith and G. N. Hoffer.

(Transmitted Dec. 8)

18. Significant Points in the Life History of the Philippine Maize Mildew, by Dr. W. H. Weston, Jr.

19. Ecologic and Physiologic Notes on Corn Smut Ustilago Zeae, by L. E. Melchers.

20. Chemical Dusts for the Control of Bunt, by W. W. Mackie and Fred N. Briggs.

MYCOLOGICAL SECTION, BOTANICAL SOCIETY OF AMERICA

1. Factors Affecting the Size of Aeciospores of Puccinia Graminis, by M. N. Levine.

2. The Heteroecism of Puccinia montanensis, Puccinia Koeleriae and Puccinia Aphanastae, by E. B. Mains.

3. The Rhamnus Hosts of Crown Rust, by I. E. Melhus and Florence S. Willey.

4. The Influence of Soil Temperature on the Development of the Wheat Plant, by James G. Dickson.

5. Oogonial Sclerospores of the Philippines, by W. H. Weston, Jr.

PUBLICATIONS AND MANUSCRIPTS IN 1920

Following is a list of papers published by the staff of the Office of Cereal Investigations during 1920 in the various series of the Department of Agriculture, in bulletin series of the cooperating State agricultural experiment Stations, and in technical journals. Manuscripts submitted during 1920 but not yet published, and a few publications by the State agricultural experiment stations which were not written by employees of the Office of Cereal Investigations, but which discuss cooperative experiments, are included in the list:

AGRONOMIC SUBJECTS

Corn

Relative Yields of Broken and Entire Kernels of Seed Corn, by Ernest B. Brown, in Jour. Amer. Soc. Agron., vol. 12, no. 6-7, p. 196, 197; issued Oct. 1, 1920.

Better Seed Corn, by C. P. Hartley, Farmers' Bulletin 1175 (revision of F.B. 415), 14 p., 9 fig.; issued Sept. 20, 1920.

Pop Corn for the Home, by C. P. Hartley and J. G. Willier, Farmers' Bulletin 553, revised; page proof read Aug. 17, 1920.

Pop Corn for the Market, by C. P. Hartley and J. G. Willier, Farmers' Bulletin 554, revised, 12 p., 10 fig.; issued July 25, 1920.

Growing Corn in the Southeastern States, by C. H. Kyle, Farmers' Bulletin 1149 (revision of F.B. 729), 19 p., 11 fig.; issued Nov. 2, 1920.

Formaldehyde Treatment of Seed Corn, by Frederick D. Richey, in Jour. Amer. Soc. Agron., vol. 12, no. 1, p. 39-43; issued Jan. 20, 1920.

The Inequality of Reciprocal Corn Crosses, by Frederick D. Richey, in Jour. Amer. Soc. Agron., vol. 12, no. 6-7, p. 185-196, fig. 14; issued Oct. 1, 1920.

Wheat

Australian Wheat Varieties in the Pacific Coast Area, by J. Allen Clark, David E. Stephens, and Victor H. Florell, Department Bulletin 877, 45 p., 3 pl.; issued Sept. 16, 1920.

Varietal Experiments with Spring Wheat in the Northern Great Plains, by J. Allen Clark, John H. Martin, and Ralph L. Smith, Department Bulletin 878, 47 p., 3 pl., 2 fig.; issued Nov. 5, 1920.

Natural Wheat-Rye Hybrids of 1918, by Clyde E. Leighty, in Journal of Heredity, vol. 11, no. 3, p. 129-136; issued March, 1920.

Varieties of Winter Wheat Adapted to the Eastern United States, by Clyde E. Leighty, Farmers' Bulletin 1108 (revision of F.B. 616); second page proof read Sept. 24, 1920.

Oats

Experiments with Kherson and Sixty-Day Oats, by C. W. Warburton and T. R. Stanton, Department Bulletin 825, 72 p., 15 fig.; issued Aug. 12, 1920.

Fall-Sown Oats, by C. W. Warburton and T. R. Stanton, Farmers' Bulletin 1119, 21 p., 9 fig.; issued Sept. 3, 1920.

Barley

Germination of Barley Pollen, by Stephen Anthony and Harry V. Harlan, in Jour. Agr. Research, vol. 18, no. 10, p. 525-536, pl. 59, 60; issued Feb. 16 1920.

Daily Development of Kernels of Hannchen Barley from Flowering to Maturity at Aberdeen, Idaho, by Harry V. Harlan, in Jour. Agr. Research, vol. 19, no. 9, p. 393-429, pl. 89-91, figs. 1-17; issued Aug. 2, 1920.

Smooth-awned Barleys, by Harry V. Harlan, in Jour. Amer. Soc. Agron., vol. 12, no. 6-7, p. 205-208, fig. 15; issued Oct. 1, 1920.

Development of Barley Kernels in Normal and Clipped Spikes and the Limitations of Awnless and Hooded Varieties, by Harry V. Harlan and Stephen Anthony, in Jour. Agr. Research, vol. 19, no. 9, p. 431-474, 13 fig.; issued Aug. 2, 1920.

Effect of Time of Irrigation on Kernel Development in Barley, by Harry V. Harlan and Stephen Anthony, submitted May 24, 1920, for publication in Journal of Agricultural Research.

Occurrence of the Fixed Intermediate Hordeum intermedium nanum in Crosses Between H. vulgare palliduм and H. distichon palmella, by Harry V. Harlan and H. K. Hayes, in Jour. Agr. Research, vol. 19, no. 11, p. 575-591, pl. 103-106; issued Sept. 1, 1920.

The Inheritance of the Length of Internode in the Culms of the Barley Spike, by H. K. Hayes and Harry V. Harlan, Department Bulletin 869, 29 p., 2 fig., 2 pl.; issued Oct. 16, 1920.

Rice

Rice Irrigation Measurements and Experiments in Sacramento Valley, 1914-1919, by Frank Adams, Cal. Agr. Expt. Sta. Bul. 329, p. 47-69, 4 fig.; issued Sept., 1920.

Prairie Rice Culture in the United States, by Charles E. Chambliss, Farmers' Bulletin 1092, 26 p., 13 fig.; issued April 14, 1920.

Rice Growing in California, by Charles E. Chambliss, Farmers' Bulletin 1141; page proof read Aug. 28, 1920.

Rice Investigations, by F. C. Quereau, La. Agr. Expt. Sta. Bul. 172, 87 p., 35 fig.; issued September, 1920.

Grain Sorghums and Broom Corn

Grain Sorghums: How to Grow Them, by Benton E. Rothgeb, Farmers' Bulletin 1137, 26 p., 15 fig.; issued Nov. 4, 1920.

Milo, a Valuable Grain Crop, by Benton E. Rothgeb Farmers Bulletin 1147, 19 p., 8 fig.; issued November 30, 1920.

Broom Corn Experiments at Woodward, Okla., by Benton E. Rothgeb and John B. Sieglinger, Department Bulletin 856, 33 p., 7 fig.; issued Apr. 27, 1920.

Temporary Roots of the Sorghums, by John B. Sieglinger in Jour. Amer. Soc. Agron., vol. 12, no. 4, p. 143-145; issued April 22, 1920.

Minor Cereals

Proso, or Hog Millet, by John H. Martin, Farmers' Bulletin 1162, 15 p., 4 fig.; issued Nov. 10, 1920.

Flax

Experiments with Flax on Breaking, by Charles H. Clark, Department Bulletin 883, 29 p., 3 fig.; issued Sept. 20, 1920.

General or Miscellaneous

Growing Irrigated Grain in Southern Idaho, by L. C. Aicher, Farmers' Bulletin 1103, 28 p., 13 fig.; issued Aug. 6, 1920.

Sixteen Years of Dry-Farm Experiments in Utah, by F. S. Harris, A. F. Bracken, and I. J. Jensen, Utah Agr. Expt. Sta. Bul. 175, 43 p., 5 fig.; issued June, 1920.

Federal Seed Grain Loans, by C. W. Warburton, in Jour. Amer. Soc. Agron., vol. 12, no. 7, p. 45-53; issued Feb. 16, 1920.

CEREAL DISEASE SUBJECTS

General Cereal Diseases

Treatment of Cereal Seeds by Dry Heat, by D. Atanasoff and A. G. Johnson, in Jour. Agr. Research, vol. 18, no. 7, p. 379-390, pl. 48, 49; issued Jan. 2, 1920.

Injury to Seed Wheat Resulting from Drying after Disinfection with Formaldehyde, by Annie May Hurd, submitted May 7, 1920, for publication in Journal of Agricultural Research; galley proof read Sept. 20, 1920; to be included in issue of November 1, delayed in printing.

Seed Coat Injury and Viability of Wheat and Barley as Factors in Susceptibility to Molds and Fungicides, by Annie May Hurd, submitted July 13, 1920, for publication in Journal of Agricultural Research; scheduled for issue of April 1, 1921.

Imperfect and Sac Fungi

Fusarium-Blight (Scab) of Wheat and Other Cereals, by Dimitr Atanasoff, in Jour. Agr. Research, vol. 20, no. 1, p. 1-32, figs. 1-2, pl. 1-4; issued Oct. 1, 1920.

The Eelworm Disease of Wheat and Its Control, by Luther P. Byars, Farmers' Bulletin 1041, revised, 11 p., 10 fig., issued February, 1920.

The Nematode Disease of Wheat Caused by Tylenchus tritici, by L. P. Byars, Department Bulletin 842, 40 p., 6 fig., 6 pl.; issued Sept. 27, 1920.

Production of Conidia in Gibberella saubinetii, by James G. Dickson and Helen Johann, in Jour. Agr. Research, vol. 19, no. 5, p. 235-237, fig. 1; issued June 1, 1920.

The Modified Rag Doll and Germinator Box, by B. H. Duddleston, Purdue Univ. (Ind.) Agr. Expt. Sta. Bul. 236, 12 p., 6 fig.; issued February, 1920.

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